

Thriving after trauma: A study of posttraumatic growth  
amongst resilient residents of Christchurch, New Zealand,  
after the 2010 and 2011 earthquakes

by

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## **Preface**

This research was conducted as part of a larger community study examining aspects of functioning amongst individuals who self-identified as coping well after the Canterbury earthquake sequence of 2010 and 2011. I contributed to the larger study design by introducing a measure of posttraumatic growth, the Posttraumatic Growth Inventory, and with data collection over 13 months: screening potential participants, arranging assessments, conducting interviews, administering questionnaires, measuring heart-rate variability, conducting neuropsychological tests of memory and facial emotion recognition, and directing participants on taking salivary samples to measure cortisol levels. Each assessment took approximately 3 hours. I entered questionnaire data into a database after the assessment and checked 10% of data for accuracy. The data used for the current thesis are drawn from the questionnaire package and interviews conducted with participants.

## **Abstract**

Research on responses to trauma has historically focused on the negative repercussions of a struggle with adversity. However, more recently, researchers have begun to examine posttraumatic growth: the positive psychological change that emerges from the struggle with a potentially traumatic event. Associations have been found between posttraumatic growth and greater peritraumatic distress, greater objective severity of trauma exposure, greater perceived stressfulness of events, social support, female gender, cognitive and behavioural responses to trauma, and personality measures.

Posttraumatic growth has been measured typically in individuals with varying levels of posttraumatic stress disorder symptoms and other psychological difficulties, such as depression and anxiety. Although some theory and research posits that higher resilience would prohibit posttraumatic growth, no studies have examined posttraumatic growth in a resilient sample. The Canterbury earthquake sequence of 2010 and 2011 involved potentially traumatic events that saw the community struggle with a variety of challenges. However, in the midst of earthquake destruction, some positive initiatives emerged, driven by locals. The Gap Filler project (using city spaces left empty from fallen buildings for art and interactive community projects) and the Student Volunteer Army (groups of volunteers coordinated to help others in need) are examples of this. In this context, it seemed likely that posttraumatic growth was occurring and might be seen in individuals who were coping well with challenges.

Culture is theorised to influence the posttraumatic growth process (Calhoun, Cann, & Tedeschi, 2010), and the nature of the trauma undergone is also likely to influence the process of growth. The current thesis measures posttraumatic growth quantitatively and qualitatively in a New Zealand sample. It measures and describes posttraumatic growth in a resilient population after the earthquake sequence of 2010 and 2011 in Canterbury, New Zealand.

Findings are used to test current models of posttraumatic growth for individuals coping well after trauma and to elaborate on mechanisms proposed by models such as the comprehensive model of posttraumatic growth (Calhoun et al., 2010) and the organismic valuing theory of growth through adversity (Joseph & Linley, 2005). Correlates of posttraumatic growth are

examined and likely supporting factors of posttraumatic growth are identified for this population.

Study 1 used quantitative analysis to explore correlates of posttraumatic growth and found that greater posttraumatic growth related to greater peritraumatic distress, greater perceived stressfulness of earthquake events, greater objective stressfulness of earthquake events, greater difficulty with stressful life events, less satisfaction with social support, and female gender. Findings from Study 1 give important detail about the nature of distress included in the comprehensive model of posttraumatic growth (Calhoun et al., 2010) for this population. Levels of posttraumatic growth were lower than those in North American studies but similar to those in a Chinese study. The current sample, however, showed lower endorsement of Relating to Others than the Chinese study, perhaps because of cultural differences.

Study 2 used qualitative analysis to examine the experience of posttraumatic growth in the sample. The theme of ‘a greater sense of community’ was found and adds to the comprehensive model of posttraumatic growth, in that an expression of posttraumatic growth (a greater connection with others) can inform ongoing social processing in the posttraumatic growth process. Having a formal or informal role in earthquake recovery appeared to influence self-concept and reflection; this elaborates on the influence of role on reflection in Calhoun et al.’s model. Findings illustrate possible mechanisms of the organismic valuing process theorised by Joseph and Linley (2005).

Implications include the importance of providing opportunities for individuals to take on a role after a crisis, encouraging them to act to respond to difficulties, and encouraging them to meet personal needs for relatedness, competence, and autonomy. Finding positive aspects to a difficult situation, as well as acknowledging adversity, can be supported in future to help individuals process their traumas. As a society, we can help individuals cope with adversity by providing ways they can meet their needs for relatedness, competence, and autonomy. Community groups likely provide opportunities for members to act in ways that meet such needs. This will allow them to effectively act to meet their needs in times of crisis.



## **CHAPTER 1**

### **Introduction**

Research on trauma has largely focussed on negative repercussions of traumatic events. More recently, researchers have noted that some individuals fare very well in the wake of potentially traumatic events. This positive change after trauma has been labelled ‘posttraumatic growth’ and has been reported to occur in a variety of ways: improved relating to others, a sense of increased personal strength, greater appreciation of life, identification of new possibilities for life because of experiencing the trauma, and a deeper existential or spiritual life (Meyerson, Grant, Carter, & Kilmer, 2011). Research and theory suggest that it is not the traumatic event itself, but the struggle that occurs as a result of the event that leads to posttraumatic growth, because traumatic events can significantly challenge an individual’s assumptions about the world (Tedeschi & Calhoun, 1995). In this thesis, terms such as ‘traumas’ or ‘traumatic events’ refer to such events, although it is possible that these events may not traumatise all individuals.

Models of posttraumatic growth describe the posttraumatic growth process and converge on the concept that trauma violates assumptions about the world and self, such as assumptions that the world is a safe place or that the self is in some way invulnerable. Such an experience incurs distress, and, in response to this distress, one must rebuild worldviews through a process of reflection and a search for meaning. It is generally agreed that this process can leave the individual with a sense of posttraumatic growth. Traditionally, studies of posttraumatic growth examine growth in samples with varying degrees of psychological difficulty and distress after a trauma (e.g., heterogeneous samples with varying numbers of symptoms of posttraumatic stress disorder). Different measures of distress show differing associations with posttraumatic growth, and these different aspects of distress have not been considered in models of posttraumatic growth. Some theorists (Westphal & Bonanno, 2007) suggest that resilient individuals are less likely to show posttraumatic growth, as they are less likely to have their worldviews shaken by adverse events. Additionally, some research assumes that lack of certain psychopathology indicates resilience in participants and that this lack of psychopathology relates to low rates of posttraumatic growth. However, resilience has not been measured in these studies, and research with resilient individuals suggests they have

particular coping approaches that differ from those of less resilient individuals. Further, other theorists (Janoff-Bulman, 2004) posit that resilient individuals could still show posttraumatic growth in certain ways that do not rely on their worldviews being challenged – for example, a view of the self as stronger after adversity. It is therefore possible that resilient individuals still undergo the posttraumatic growth process, but that it may be qualitatively different and may be expressed differently when compared with individuals who are less resilient.

This thesis aims to examine how posttraumatic growth relates to resilience, whether it is expressed in resilient individuals, and, if so, how it might be expressed. Aspects of distress are examined separately, and their relations to posttraumatic growth are examined. The influence of gender on posttraumatic growth in a resilient population is explored. Models of posttraumatic growth are examined and findings from the current studies used to propose modifications and additions to models.

In the early hours of September 4th 2010, a magnitude (M) 7.1 earthquake woke residents of Canterbury. Prior to this earthquake, there had been little indication that the fault responsible existed and could generate large earthquakes (British Geological Survey, 2011). This initial earthquake began a sequence of almost continuous aftershocks, three of which were larger than M6 (those on February 22nd 2011, June 13th 2011, and December 23rd 2011). Of these aftershocks, the M6.3 on February 22nd incurred the most devastation. It resulted in 185 deaths and extensive damage to the city's infrastructure (Christopherson, Rhoades, Hainzl, & Gerstenberger, 2013). This earthquake occurred at 12.51pm, over lunchtime, when the city was at its busiest. Two multi-storied buildings collapsed, sparking fires and killing 115 people. Falling debris and landslides caused further deaths, crushing two buses and trapping people beneath rubble. The steeple of ChristChurch Cathedral, a city landmark, collapsed. Power, phone lines, and water supplies were lost; many hundreds were injured; ambulance services could not meet demand; pipes burst, flooding the streets with water. Liquefaction (where soil behaves more like a liquid than a solid) occurred in parts of the city, a new experience for most. One man in the city centre at the time described the city "as though a bomb had hit it. There was dust and smoke in the air and bits of glass and rubble falling from the tops of buildings. People were walking around covered in blood and in tears – it was just shocking" (Glendinning & Adams, 2011).

Approximately half of all buildings in the central city have been demolished because of earthquake damage, and approximately 7,000 homes have been deemed unliveable (McSaveney, 2014). The status of government and private insurance payments was unclear for several months for some residents, and years for others, extending the disruption and stress caused by the initial earthquakes (McCrone, 2014). When power was restored to houses, residents could access TV footage with continuous coverage of the damage. Residents made their way home through a broken city, commonly experiencing uncertainty and worry in the wait to confirm the safety of loved ones. Many set to securing shelter and creating alternatives for cooking and toileting systems. Subsequently, new challenges emerged in the form of changing neighbourhoods, losing some friends and making new ones, adapting to changes in employment opportunities, and negotiating the processes involved in repairing or replacing homes.

The repercussions of the earthquakes were extensive and ongoing, affecting Cantabrians in differing ways and to differing degrees. Faced with such adversity, residents worked to manage the fallout: adapting living environments, grieving losses, and rebuilding lives and homes. In some cases, residents experienced posttraumatic stress and illness; others coped with the hardship and adapted to the changed circumstances; many reported some positive outcomes emerging from their difficulties, despite the challenges. Further, some positive community initiatives emerged, driven by locals. The Gap Filler project facilitated interactive community projects using empty spaces left by fallen buildings. Projects included cycle-powered cinemas, an outdoor dance floor that members of the public could use and dance to their own music, and a book exchange with a couch and a recycled fridge full of donated books. The Student Volunteer Army was set up to coordinate groups of volunteers to help others in need. ‘Guerrilla gardening’ groups encouraged the growth of greenery, or introduced plants to empty lots (Bennett, Dann, Johnson, & Reynolds, 2014). In this context, it seemed likely that posttraumatic growth was occurring, and might be seen in individuals who were coping well with difficulties. This seemed to challenge the concept that resilience dampens posttraumatic growth because individuals higher in resilience are less affected by trauma.

Models of posttraumatic growth (i.e., Calhoun et al., 2010) acknowledge influences on the process of posttraumatic growth, such as culture, individual differences, pre-existing

worldviews, emotional distress, sociocultural factors, and cognitive coping approaches, such as rumination. Existing research suggests that the type of trauma experienced influences the process of posttraumatic growth, leading to different types of positive change after the trauma. For example, qualitative studies have found aspects of positive change after health-related trauma, such as changes in health-related behaviour. Changes in health-related behaviour are not assessed by existing measures of posttraumatic growth. Studies of posttraumatic growth to date have used either quantitative or qualitative methods to examine posttraumatic growth, but not both.

The current thesis measures posttraumatic growth in a sample of individuals coping well after trauma, examining posttraumatic growth quantitatively with a widely used, well-validated measure in a New Zealand context. Using the same quantitative measure as in many international studies allows comparison between post-earthquake posttraumatic growth in Christchurch (New Zealand) and other countries. Such comparisons are useful for informing future cross-cultural research into posttraumatic growth with groups in different cultural environments. The association between resilience and posttraumatic growth is explored to ascertain whether higher resilience might relate to reduced posttraumatic growth. Further, measuring different aspects of distress after the earthquakes clarifies the different contributions of each type of distress to the process of posttraumatic growth, for individuals coping well after trauma. A mixed-methods approach allows quantitative findings to be further explored, with qualitative analysis of posttraumatic growth. Findings highlight where current models of the posttraumatic growth process apply to individuals coping well, and where models might be expanded upon.

### **1.1 Defining and describing posttraumatic growth**

Posttraumatic growth is the positive change that can occur after a struggle with a potentially traumatic event. It suggests that, rather than remaining unchanged by a trauma, an individual grows and experiences personal improvements because of their difficult experience (Calhoun & Tedeschi, 1998). It is theorised that posttraumatic growth emerges after the shattering of assumptive worldviews and efforts to rebuild worldviews that encompass an understanding of the trauma (Janoff-Bulman, 1992).

The concept of adversity producing strength of character is not new; some ancient civilisations viewed troubled times as necessary for cathartic change and growth. Confucius

is reputed to have said, “The gem cannot be polished without friction, nor man perfected without trials.” However, it is only over the last 20 to 30 years that positive changes after trauma have been systematically explored within the social and behavioural sciences. Researchers have coined the terms posttraumatic growth (Tedeschi & Calhoun, 1996), ‘stress-related growth’ (Park, Cohen, & Murch, 1996), and ‘growth through adversity’ (Joseph & Linley, 2005) to describe trauma-related positive change.

### ***1.1.2 Facets of posttraumatic growth***

Tedeschi and Calhoun’s (1995) review of research and clinical experience with trauma survivors identified positive changes as a common theme. These changes were categorised within three areas of functioning: the self, philosophy of life, and relationships with others. The observations were used to develop the Posttraumatic Growth Inventory as a self-report measure of posttraumatic growth, which was tested with trauma survivors to confirm item validity (Tedeschi & Calhoun, 1996). Factor analysis of the Posttraumatic Growth Inventory yielded five factors: personal strength, greater appreciation of life, better relationships with others, spiritual change, and new possibilities because of the struggle with trauma. Other measures yield differing numbers of factors of posttraumatic growth: the Stress-Related Growth Scale (Park et al., 1996) measures growth as a single dimension, whereas the Revised Stress-Related Growth Scale (Armeli, Gunthert, & Cohen, 2001) identifies seven domains of growth: Life Satisfaction, Optimism, Regulation, Religiousness, Treatment of Others, Belongingness, Self-understanding, and Personal Strength.

Although the extant tools may not agree on the number of areas of statistical factors of growth, accounts of trauma survivors and quantitative research provide much information to indicate three broad domains of growth shown after adversity: growth in the domain of the self, changes in life philosophy, and improvements in relating to others.

#### ***1.1.2.1 Growth in the domain of the self: Personal strength and new possibilities***

Often the act of facing challenges that adversity brings can change one’s perception of the world, and of oneself. For example, the world may be seen as more unpredictable or threatening than prior to a traumatic event. In this context, an individual might view the self as vulnerable; yet if one’s ability and character have been tested and proved capable, this experience can boost a sense of personal agency and strength (Janoff-Bulman, 1992).

Likewise, the need to learn new skills because of difficulties may result in an increased sense of competency and strength. For example, a woman who feels forced to be more independent when her partner is injured, and must take on driving and navigating tasks under stressful circumstances, might develop a sense of greater strength through taking on these extra tasks.

Trauma can engender opportunities that may not have existed had the traumatic event not occurred. Following trauma, many identify new possibilities for their lives. For example, those influenced by their difficulties may try to help others like them; after struggling with grief, one woman identified her desire to train as an oncology nurse to help others experiencing similar hardships (Tedeschi & Calhoun, 2004).

#### *1.1.2.2 Change in life philosophy: Appreciation of life and spirituality*

Following traumatic events, some note a greater appreciation of life and the things in it as a result of their struggles. Along with this greater appreciation of life comes a revised sense of what is important and a reprioritisation of how time and energy are invested, especially when the trauma reinforces the fragility of life (Cordova, Cunningham, Carlson, & Andrykowski, 2001). Small pleasures that still remain may be celebrated all the more.

Some experience growth in their understanding of spiritual or existential matters as a result of grappling with trauma. An individual might change private spiritual practices, become more involved with spiritual or philosophical social activities, and become more committed to spiritual exploration (Denney, Aten, & Leavell, 2011). A perception of greater understanding of spiritual meaning often accompanies exploration of religious beliefs. However, non-religious or atheist individuals may engage more with existential themes and experience this engagement as growth. For example, in response to a year-long debilitating illness, T. Weiss (2005), who described having no faith in God, examined personal journals and noted themes she described as ‘mythical’. Such themes included concepts of rebirth, where the author wrote of her illness as a time of profound change, akin to a ‘death to the old self’ and an emergence of a new, transformed self. Illness was depicted as a source of existential and spiritual insight, where the writer saw herself as having died and been reborn as a positively transformed individual. Weiss also described her experience as a journey to a dark, scary place where she had no compass, and from which it was possible to return with some gifts, such as wisdom. Further, a theme of a ‘battle for survival’ was present, akin to struggles

between good and evil, light and darkness. These ways of thinking enabled Weiss to gain a sense of emerging from struggle reborn and fresh, with gifts of wisdom and a perception of the self as a fighter rather than a victim. Wernimont (2013) argues that in a world where growing numbers of individuals identify as having no religion, it is important to consider that ideas of existentialism can exist outside of religion or spirituality. As such it is likely that existential thought among secular individuals contributes to posttraumatic growth, but that the Posttraumatic Growth Inventory might not capture this growth as it includes questions about spiritual matters and religious faith to measure the Spiritual Change domain of posttraumatic growth.

#### *1.1.2.3 Changes in relating to others*

Relationships with others may be enriched during challenging experiences, because of the experience of receiving greater support from others. Reflecting on the value of supportive others can increase one's sense of gratitude, and also what one may be willing to invest in a relationship. Appreciation of other people and friendships may increase. In the same vein, the individual may realise which relationships provide the most support and choose to invest in these relationships more, neglecting other more stressful relationships. In this way, the quality of relationships with others may be perceived to improve. Finally, stressors can stir compassion for those who are enduring similar traumas. This encourages reaching out to develop more positive, supporting relationships with others (Janoff-Bulman, 2004).

### **1.2 Definitional issues in posttraumatic growth: Posttraumatic growth, stress-related growth, and benefit finding**

Positive changes after adversity are referred to by numerous terms such as posttraumatic growth, stress-related growth, 'benefit finding', and more. The different terms reflect the difficulty of defining and operationalising these positive changes (Sumalla, Ochoa, & Blanco, 2009). Some authors borrow a definition for stress-related growth or benefit finding from research on posttraumatic growth (Helgeson, Reynolds, & Tomich, 2006; Vaughn, Roesch, & Aldridge, 2009), which is the experience or perception of gaining benefits from the struggle with stressful events. Thus, posttraumatic growth, stress-related growth, and benefit finding might be assumed to refer to the same construct.

The term benefit finding is also often used in conjunction with other terms describing flourishing after adversity, and is often not distinguished from posttraumatic growth, as seen in reviews and meta-analyses where benefit finding is used as a synonym for posttraumatic growth (e.g., Helgeson et al., 2006). However, benefit finding and posttraumatic growth have been argued convincingly to be related, but distinct, constructs (Mols, Vingerhoets, Coebergh, & van de Poll-Franse, 2009; Sears, Stanton, & Danoff-Burg, 2003). Sears et al. (2003) define benefit finding as distinct from both positive reappraisal and posttraumatic growth: benefit finding refers to the process of identifying benefits from hardship, whereas positive reappraisal involves reminding oneself of the benefits. ‘Benefit reminding’ is related to benefit finding and is conceptualised as an effortful, intentional attempt to manage stress through reminding oneself of positive aspects of one’s experiences. Benefit finding and positive reappraisal are theorised as instrumental in the process of posttraumatic growth, which is conceptualised as recognising a more enduring positive change. For example, a man disfigured by a motor vehicle accident may appreciate that his partner and friends are supportive and loving after the accident (benefit finding) and remind himself that his partner expressing attraction toward him regardless of his appearance helps him cope with burns (positive reappraisal), which might encourage him to devote more time and energy to his friends and family, thereby strengthening his relationships (posttraumatic growth).

In the same vein, Thornton (2002) argues that benefit finding, ‘sense making’, and posttraumatic growth need to be defined and disentangled. Thornton defines the terms as follows: sense making is the process triggered by a stressful event that does not fit an individual’s assumptive worldviews, which instigates a review of these worldviews to make sense of the event. These changed beliefs can amount to growth. Benefit finding refers to the process by which an individual places value on an event because of the positive outcomes identified. Davis, Nolen-Hoeksema, and Larson (1998) found that, for grieving individuals, making sense of loss was associated with less distress after death of a loved one, whereas benefit finding was associated with adjustment 1 year after the death, and also with the individual’s dispositional optimism. Making sense of the death was not associated with finding benefit in the bereavement, suggesting independent roles for these processes. Joseph and Linley’s (2005) organismic valuing theory describes positive accommodation of a changed worldview leading to posttraumatic growth. Benefit finding can be seen as similar to



this positive accommodation; however, benefit finding also describes a positive accommodation of changes resulting from a trauma, reflecting a more comprehensive positive approach to the changes in one's life. Joseph and Linley's (2005) organismic valuing theory will be described in more detail below.

Rather than being synonymous with posttraumatic growth, benefit finding, sense making, and positive reappraisal appear to be independent processes that contribute to the outcome of posttraumatic growth. However, in much of the existing research, the terms benefit finding and posttraumatic growth are used synonymously, making it essential for each author to define the term. The current thesis considers posttraumatic growth as the positive changes that come about as a result of experiencing trauma. Research on benefit finding has been included in the literature review because of the common conflation of benefit finding and posttraumatic growth, and thus the potential utility of research on benefit finding for understanding posttraumatic growth. Where findings concern specific research on benefit finding, this is outlined in the current thesis.

### **1.3 Is posttraumatic growth indicative of real change, a coping strategy, or both?**

Posttraumatic growth is theorised by some to reflect 'real', measurable positive change: an outcome of dealing with adversity. Others conceptualise it as a method of coping with stressful events, an illusory sense of positive change that helps ease the discomfort of negative events. A third possibility considered by some authors is that growth can both function as a coping strategy and be an outcome of coping (Zoellner & Maercker, 2006). Whether or not posttraumatic growth is a 'real' functional change or merely a perceived change that helps an individual cope is difficult to ascertain from self-reports, unless there is also evidence of changed behaviour after trauma. Additionally, if posttraumatic growth does function at least in part as a coping mechanism, there is no evidence that this is harmful to an individual. Thus, some might question whether it is an important question whether posttraumatic growth is a measurable change that can be perceived by others, or is merely self-reported positive change that allows for better coping. However, theorists to date have debated the 'real' or 'illusory' nature of posttraumatic growth, and it is relevant to describe theories and supporting findings in the current thesis to expand on the definition of posttraumatic growth.

Tedeschi and Calhoun's widely used model (2004), Joseph and Linley's organismic valuing theory (2005), Janoff-Bulman's (2004) model, and Schaefer and Moos' (1992) model outline growth broadly as a positive outcome of dealing with hardship. Implicit in these models is the idea that growth reflects change that is 'real' and not an illusion serving to ease the distress of a trauma. Studies show that what trauma victims report about their own growth does not differ significantly from what their spouses or partners report (Moore et al., 2011; Shakespeare-Finch & Enders, 2008; T. Weiss, 2002). This supports the theory that growth reflects real change. Second, reports of growth are not associated with social desirability measures; those traumatised are not reporting growth because they deem it is expected of them or admired by others (Salsman, Segerstrom, Brechting, Carlson, & Andrykowski, 2009). Third, reports of posttraumatic growth do not appear to be an effort to deny the difficult realities of an experience. A recent systematic review of qualitative studies of posttraumatic growth in individuals with physical illness found that individuals who reported posttraumatic growth described both positive and negative aspects to their experiences (Hefferon, Greal, & Mutrie, 2009). Finally, some authors suggest that behavioural change after processing a traumatic experience validates reports of posttraumatic growth. Such changes may be dietary improvements or changes in leisure activities (Mols et al., 2009). Some research has found that individuals reporting positive behavioural changes in the aftermath of various traumas showed higher levels of posttraumatic growth than those reporting fewer behavioural changes. These changes were validated by reports from significant others and included such things as spending more time with friends and family, increasing learning, changing career path, and exercising more (Shakespeare-Finch & Barrington, 2012). Although behavioural changes have been shown to correlate with growth, this does not discount growth that is purely psychological in nature. Action related to growth may not always be practicable or necessary; where problem solving may not be possible, cognitive and emotional coping may be more appropriate (Westphal & Bonanno, 2007).

Posttraumatic growth can also be conceptualised as a coping strategy to aid adjustment. Davis et al. (1998) describe the coping process after a stressful event as a search for meaning. In their research with grieving families, they identified two parts to this search for meaning: the first questioning why the event happened, and the second searching for benefits that can be taken from the experience. A perception of growth may thus have a role in adjustment

after a stressful event; perceiving benefit from the trauma may help grieving individuals cope with their loss.

According to Park and Folkman (1997), the task of coping is to merge the meaning from a traumatic event with the meaning encompassed in an individual's worldview. These authors suggest that appraisal of adversity is either modified to fit with pre-existing worldviews (assimilation) or the worldviews are modified to create a new philosophy of life, accommodating the new meaning drawn from adversity. In such a way, posttraumatic growth might reflect appraisal of a traumatic event as having some benefits, so as to assimilate the event into a pre-existing worldview that some good can be found in every situation. If the traumatic event modified more-enduring worldviews, posttraumatic growth may reflect a philosophy of life changing from the world being predictable and stable to the world not always being predictable, but loved ones being dependable when stressful events occur. Thus, in Park and Folkman's framework, posttraumatic growth describes a type of coping.

Posttraumatic growth has also been suggested to be a positive illusion to regain self-esteem, aiding psychological adjustment. In the theory of cognitive adaptation described by Taylor (1983), three main elements of adjustment are the search for meaning, the attempt to regain control over life and the stressful event, and the use of self-enhancing illusions to boost self-esteem. In this framework, posttraumatic growth may be conceptualised as a self-enhancing illusion useful for coping. Favourable comparisons to others in similar situations may help preserve a sense of being fortunate; this can be the case especially if an individual does not consider the complex mechanisms perpetuating trauma (e.g., in the case of cancer).

Associating with others perceived to have a brighter prognosis may also help maintain a sense of hope for the future (Klauer, Ferring, & Filipp, 1998). Theoretically, then, one can obtain a sense of hope both from comparing oneself favourably to others in less fortunate positions and from gaining inspiration from others who have a brighter prognosis. This suggests that the way an individual frames and processes their experience in relation to others is an important part of the equation when adjusting to a new event in their life. It is possible that this is less a 'self-enhancing illusion' (Taylor, 1983), which suggests that the way of perceiving the self is unrealistic, than a cognitive strategy to frame one's own circumstances in a favourable light and through this to gain a sense of hope.

Support for the theory that posttraumatic growth may be illusory and useful for coping comes from comparisons of self before and after a range of negative life events. McFarland and Alvaro (2000) assigned participants randomly to either consider a traumatic event in their past or to consider a stressful, less traumatic event in their past. Individuals reporting changes to self after more traumatic events reported themselves in a more negative light *prior* to the event than did individuals considering a less traumatic event. In this way, they perceived having experienced more growth than those considering less traumatic events. This suggests a tendency for greater perceived threat to produce greater self-enhancing illusions, through comparing the self favourably over time. Likewise, Davis and McKearney (2003) found that reminders of near-death experiences and reminders of mortality stimulated greater reported meaning in life, compared with reminders of non near-death experiences. They conclude that an increased sense of meaning in life is used to defend against fear of death and existential anxiety. It may also be that events that are more life-threatening encourage individuals to consider the fragility of life, and this may underpin an increased appreciation of daily living, given that life could so easily be removed. Such a possibility is suggested by existential theory, where reminders of mortality disturb the balance of one's life and give opportunities to reassess one's life values (Spiegel & Classen, 2000).

One study by Frazier et al. (2009) has reported that posttraumatic growth may not relate to actual growth, and thus may reflect an illusion of growth. However, several methodological problems are observable in this study. To measure 'actual' growth, a group of university students were surveyed at Time 1 and asked to rate themselves on items of the Posttraumatic Growth Inventory reworded to refer to current circumstances for the participants, rather than to refer to changes since a trauma. For example, an item used in the modified scale was 'I have been able to do good things with my life' over the last 2 weeks, whereas in the Posttraumatic Growth Inventory this item is 'I have been able to do better things with my life' since the traumatic event. These modified items were used again at Time 2, 8 weeks later, when participants were also asked if they had experienced a traumatic event between Time 1 and Time 2. This approach ignores the role of time in the development of posttraumatic growth. At most, participants were able to have experienced a trauma 8 weeks before being reassessed; in comparison to other studies, up to 8 weeks after a trauma is a very short time in which to assess growth (Aspinwall & Tedeschi, 2010). An additional indication

of ‘actual’ posttraumatic growth was examined before and after the trauma using scales other than the Posttraumatic Growth Inventory chosen to assess domains of posttraumatic growth, such as scales of life satisfaction and gratitude. Such scales do not reflect the same areas of posttraumatic growth that are measured by the Posttraumatic Growth Inventory. Thus, it is unsurprising that findings of ‘actual’ growth did not relate to posttraumatic growth measured by the Posttraumatic Growth Inventory.

Maercker and Zoellner’s (2004) ‘Janus-face’ model of posttraumatic growth assumes that a constructive, real component of posttraumatic growth and an illusory, coping component co-exist. The constructive side of growth is associated with long-term adjustment, whereas the illusory side may compensate for short-term emotional distress. Support for this theory derives from the range of proactive and avoidant coping styles associated with posttraumatic growth, from reappraisal and problem solving to denial and emotion-focused coping, indicating that coping strategies traditionally considered ‘adaptive’ and ‘maladaptive’ can co-exist with growth. Longitudinal studies, however, show a more consistent trend of posttraumatic growth associated with psychological adjustment (Frazier, Conlon, & Glaser, 2001; McMillen, Smith, & Fisher, 1997). Over time, it is proposed that successful coping is associated with a decrease in palliative illusions of positive change and an increase in constructive growth (Zoellner & Maercker, 2006).

Regardless of whether the nature of posttraumatic growth is at least in part illusory, research is inconclusive as to whether having these positive illusions is problematic, adaptive, or harmless. This is in part because of the definitions of ‘illusion’ and ‘wellbeing’ and how these constructs have been measured in studies. Additionally, different aspects of positive illusions may be helpful for functioning, while simultaneously hindering other functions. Young’s (2014) review examines research on how ‘illusions’ may be related to psychological health, physical health, and adaptation. It seems likely that in cases where agents have a positive expectation of the future, they are more likely to invest time and energy and the expectation may be fulfilled. This casts further doubt on whether such beliefs about the future and the self can be classified as ‘false’, given that such a perspective affects the likely outcome of one’s actions. Further, ‘positive illusions’ and unrealistic optimism can in some circumstances result in taking more action. For example, men who were seropositive for HIV and who were optimistic about their prognosis, despite the knowledge of their increased risk

of AIDS, engaged in better health practices than those who were seropositive but pessimistic (Taylor et al., 1992).

Positive illusions do not appear to interfere with making decisions or weighing up new information. For example, negative information introduced in the face of a positive illusion will be acknowledged, and the illusion restructured. According to Young (2014), individuals then change their perceptions of their prior beliefs, so as to believe that they had always held the modified view. Positive illusions appear to be ‘suspended’ during decision-making processes, where all information is being weighed to make an appropriate decision; personal weaknesses, the likelihood of success, and available resources will be acknowledged, and then once a course of action has been decided upon, more positive expectations are reinstated about the outcome of the course of action (Taylor & Gollwitzer, 1995). However, when optimistic expectations are not fulfilled, intense negative emotion can be triggered (Colvin & Block, 1994), suggesting that unrealistic optimism could hinder psychological functioning. Additionally, some research suggests that, in social contexts, those with an exaggerated view of their qualities tend to make a first impression of being more agreeable and entertaining, but as others get to know them they are more likely to be judged as overestimating their abilities, hostile, and defensive. Individuals without such a self-enhancement bias are less likely to be judged agreeable on first impression, but more likely to be deemed interesting, intelligent, and cheerful as others get to know them (Paulhus, 1998). Therefore, positive illusions about the self may be damaging in some aspects in the longer term, but helpful in the short term.

To summarise, some research supports the assertion that posttraumatic growth is a real change after trauma, and other research shows that posttraumatic growth may in part be a self-enhancing illusion functioning as a coping strategy. As associations between posttraumatic growth, coping styles, and adjustment change over time, it seems likely that Zoellner and Maercker’s (2006) Janus-face model of posttraumatic growth has merit and that posttraumatic growth both contributes to coping early after a trauma and is a real, measurable change after trauma. Where posttraumatic growth has been deemed a ‘positive illusion’ by some theorists, this illusory aspect may be helpful for wellbeing in some circumstances, particularly where the illusions lead to action.

In the current thesis, Study 2 allows for exploration of whether individuals report behavioural changes related to posttraumatic growth, which can provide some evidence for ‘real change’

according to the Janus-face model (Zoellner & Maercker, 2006). Likewise, it is possible that individuals might be cognisant of using positive reframing or benefit finding to cope, suggesting that the act of benefit finding or positive reframing functions as a coping mechanism, whereas posttraumatic growth reflects the real positive change from facing adversity. Given the ongoing nature of the difficulties associated with the earthquake sequence (such as aftershocks and difficulties with authorities), the Janus-face model hypothesises that some aspects of reported posttraumatic growth may be a mechanism for coping with immediate stressors, whereas other aspects might reflect ‘real change’ from processing initial earthquake traumas in 2010 and 2011.

#### **1.4 Models of posttraumatic growth**

As the study of posttraumatic growth is relatively new, the specific details of the process of growth have yet to be conclusively clarified. Models of growth have been proposed by different researchers (e.g., Calhoun et al., 2010; Calhoun & Tedeschi, 2006; Janoff-Bulman, 2004; Joseph & Linley, 2005; Park et al., 1996; Taylor, 1983). These models all focus on aspects of the process of posttraumatic growth. Models converge on the concept that the process of trauma violates worldviews and assumptions about the self. In order to rebuild and modify these worldviews, a process of reflection and a search for meaning must occur. This process leaves the individual with the sense of having grown (Park & Helgeson, 2006).

This section describes models formulated to describe the process of posttraumatic growth. The current thesis will look to find evidence for mechanisms in the comprehensive model of posttraumatic growth (Calhoun et al., 2010) and the organismic theory of growth through adversity (Joseph & Linley, 2005) that are proposed to influence the process of posttraumatic growth. Such analysis will elucidate whether models of posttraumatic growth apply equally well to resilient individuals as they do to individuals who have developed psychopathology after trauma. Additionally, models will be adapted to expand on types of distress that are important for the promotion of posttraumatic growth in individuals coping well.

Models of posttraumatic growth are heavily weighted toward understanding the process of posttraumatic growth and those factors that contribute to posttraumatic growth, rather than describing posttraumatic growth as a static outcome. Calhoun et al.’s (2010) model outlines growth briefly in one of its components as ‘recognition of strengths, resources, and possibilities’, which broadly refers to the kinds of positive changes noted from qualitative

research into posttraumatic growth, as described above. None of the models to date considers the influence of resilience or coping well after a trauma on the process of posttraumatic growth.

The most extensively developed model of posttraumatic growth is the comprehensive model of posttraumatic growth proposed by Calhoun et al. (2010) that focuses on describing aspects of the posttraumatic growth process. The organismic valuing theory of growth through adversity (Joseph & Linley, 2005) coherently combines models of posttraumatic growth with models of posttraumatic stress disorder to propose processes for how both posttraumatic growth and posttraumatic stress disorder might develop after a trauma.

#### ***1.4.1 Calhoun, Cann, and Tedeschi's (2010) revised comprehensive model of posttraumatic growth***

The revised comprehensive model of posttraumatic growth builds on Tedeschi and Calhoun's (1996) model, adding cultural influences as being important for the expression of posttraumatic growth. The model focuses largely on the ruminative processes after a trauma, which are influenced by emotional distress and coping mechanisms to produce posttraumatic growth. The model proposes that an individual has assumptive world beliefs, personal characteristics (such as optimism or gender), and cultural influences prior to experiencing a trauma. According to this model, when faced with a traumatic or stressful event, the individual's assumptive worldviews are threatened; both the event and the challenge to these beliefs induce emotional distress. Distress is met with coping efforts such as ruminating, seeking to disclose to others, and analysing oneself. These processes lead to distress management, reassessment of goals, and redirecting intrusive rumination to reflective rumination to reshape schema and narratives about the world and the self. These coping processes and reforming of schema are influenced by sociocultural forces, such as having access to supports, modelling of posttraumatic growth by a friend or acquaintance, and broad cultural themes. Revising one's schema to integrate the traumatic event leads to accepting the world as changed, recognising one's own strength, and posttraumatic growth. As such, one's schema and narrative of life are fuller and more complex. Wellbeing and satisfaction with life emerge from the revised life narrative and acceptance of one's world as changed. Calhoun et al.'s (2010) model depicts the process of posttraumatic growth and therefore does not conceptualise growth as static. The model implicitly acknowledges that posttraumatic growth



changes across time, in line with findings from research. Other elements found to influence posttraumatic growth are optimism and gender (Helgeson et al, 2006), which can fit into ‘individual differences’ pre-trauma in the model. (These factors will be described further in section 1.7 of the current thesis that describes factors related to posttraumatic growth.) The nature of ongoing distress is not specified in the model, and neither is it specified whether the processes differ for individuals struggling psychologically after trauma and those who are coping well. Figure 1 illustrates the comprehensive model of posttraumatic growth (Calhoun et al., 2010).

#### ***1.4.2 Joseph and Linley’s (2005) organismic valuing theory of growth through adversity***

The organismic valuing theory of growth through adversity incorporates posttraumatic stress disorder and posttraumatic growth research, which have traditionally not been considered together in existing models. The model proposes that an intrinsic drive toward growth leads individuals to work to incorporate a trauma into previously existing worldviews. The way this new information is processed influences whether an individual goes on to develop either posttraumatic growth, or posttraumatic stress disorder, or neither. The incorporation of a new trauma into one’s worldview is difficult and emotionally distressing. In order to manage emotional distress, cognitive intrusions and avoidance function together to maintain a manageable level of emotion until an equilibrium is reached and the individual has found a way to comprehend the trauma experienced. If an individual cannot process the trauma cognitively or emotionally, this may lead to posttraumatic stress disorder. After comprehending the trauma, the individual can then move on to find the significance of the trauma for their lives. Processing the new trauma-related information happens in one of two ways: assimilation or accommodation. Assimilation involves incorporating trauma-related information into existing worldviews; accommodation involves changing existing worldviews to reflect the new information. Assimilation results in a return to baseline functioning, as views of the world and the self do not change. An example of assimilation might be that after an illness an individual blames him or herself for the illness in order to preserve a worldview of safety and fairness. Accommodation might see the individual modify his or her worldviews to see the world as a random place where bad things can happen. Accommodation is needed for posttraumatic growth as one’s views of the world and the self

change. However, creating a new worldview can lead to positive or negative responses. For example, if after an earthquake a new worldview is created that the earth is no longer predictable and bad things could happen without warning, a negative accommodation of the new worldview might be to feel depressed or anxious because bad things could happen at any time. A positive accommodation involves finding meaning and significance in the trauma experience: anything bad could happen at any time, and thus it is good to enjoy each moment and live each day fully. Such positive accommodation leads to posttraumatic growth, whereas negative accommodation can lead to psychopathology. An additional, important component of this model is the organismic valuing process, which is an instinctive self-knowledge each individual possesses on how to best meet their own needs for autonomy, competence, and connection with others, in order to gain fulfilment and wellbeing. Where a social environment allows an individual to pursue this fulfilment, it is possible to follow the organismic valuing process instinct on how to do this; where an environment impedes the search for fulfilment, an individual is less able to follow their own instincts to meet their needs for connection, autonomy, and competence. If the organismic valuing process has been facilitated prior to a trauma so that an individual has been able to meet their own personal needs, an overall approach to life will have been developed that includes knowledge of how to go about meeting personal needs and following the individual's organismic valuing process when a traumatic event occurs. The organismic valuing process leads individuals to follow instincts when rebuilding worldviews, so that new worldviews are built in a way that is authentic to the true self and priorities. This then leads to posttraumatic growth. Further, posttraumatic growth can lead to wellbeing over time (the authors note that posttraumatic growth is found in some research to be associated with decreases in posttraumatic stress disorder symptoms over time). Posttraumatic growth may not always lead to an increase in happiness, however: a sense of sadness, yet of increased wisdom, may be experienced because of the increased recognition of the pleasant and unpleasant seasons common to the human condition. Although this theory draws together aspects of different theories to propose contributors to posttraumatic growth and posttraumatic stress disorder processes, it has not yet been illustrated by posttraumatic growth research how the organismic valuing process works to contribute to growth.

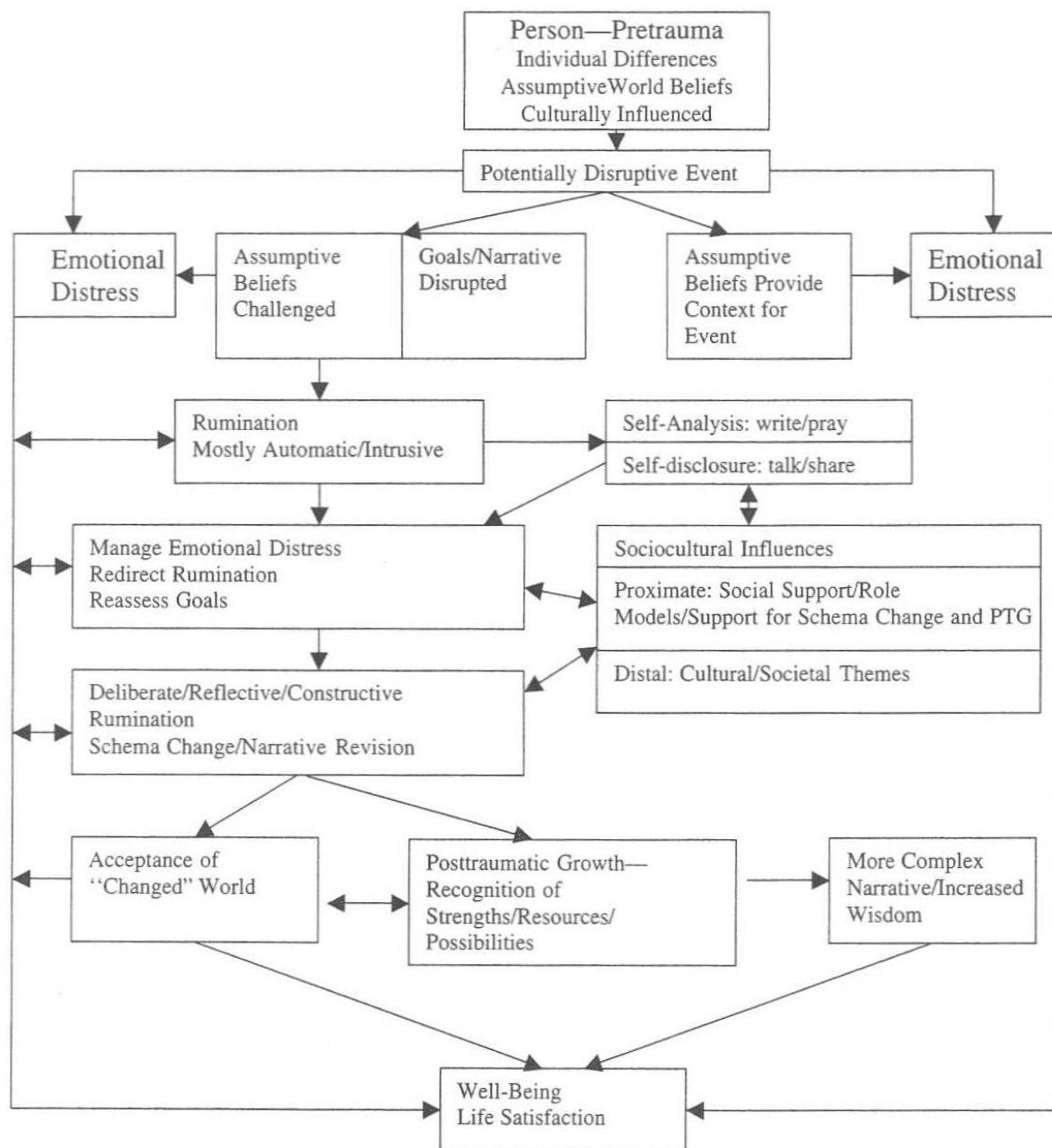


Figure 1: Calhoun, Cann, and Tedeschi's comprehensive model of posttraumatic growth

From "The Posttraumatic Growth Model: Sociocultural Considerations," by L. G. Calhoun, A. Cann, and R. G. Tedeschi, in T. P. Weiss and R. Berger (Eds.), *Posttraumatic Growth and Culturally Competent Practice: Lessons Learned From Around The Globe* (p. 6), 2010, Hoboken, NJ: John Wiley & Sons. Copyright 2010 by John Wiley & Sons Inc.

### ***1.4.3 Other theories about posttraumatic growth as a result of challenges to one's worldviews***

Park and Ai's (2006) and Janoff-Bulman's (2006) theories are both compatible with Calhoun et al.'s (2010) comprehensive model of posttraumatic growth. These two theories elaborate extensively on the pre-existing schema (worldviews) that are challenged and thus produce growth.

Park and Ai (2006) present a framework for 'meaning making' after trauma. They describe schema about global meaning prior to a trauma, covering beliefs about justice, control, predictability, fairness, comprehensibility, coherence, and vulnerability. Individuals also hold concepts of life goals, such as relationships, career, and personal goals; they have a subjective sense of meaningfulness that is measured by judging whether they are working toward their goals. This global meaning is then confronted with a traumatic event that may violate beliefs about vulnerability or control, for example. The extent to which the appraisal of the event is different from one's prior schema of global meaning dictates the level of discomfort and distress experienced as a result of an introduced perception of uncontrollability, vulnerability, or unpredictability. This violation leads to distress and a coping process involving meaning making, where an individual works to understand and perceive the trauma differently and to amend original ideas about global meaning so that they are compatible with the appraisal of the event. For example, victims of sexual assault, in appraising themselves as more vulnerable, also often amend their worldviews to consider the world as not always safe and other people as not always having benevolent motives. In the process of reappraisal of the event and one's world, some identify redeeming features of the trauma; this is theorised to encourage perceptions of posttraumatic growth.

Janoff-Bulman's (2006) theory elaborates on changes in worldviews in response to trauma, proposing that the process of redeveloping a set of assumptions regarding the world and self makes the individual more psychologically prepared for future difficulties. Initial fundamental assumptions are a set of theories built from one's own experiences that allow one to understand those experiences and plan, predict, and perceive events in certain ways. These assumptions are reinforced over time and are typically simple and overgeneralised theories of expectations for interactions with the world and others. Intellectually, one may recognise that bad things do happen; vehicle accidents happen, assaults occur, and illnesses

exist. However, before experiencing such a trauma, some sense of invulnerability may exist: 'These things may happen, but they are unlikely to happen to me'. Thus, when a trauma does strike, expectations are disconfirmed and upheaval ensues. Coping with stressful events involves integrating traumatic experiences into one's schema, in order to account for the victimisation yet move on with one's life. For example, a schema that 'vehicle accidents do happen, but they are unlikely to happen to me' will be challenged by the event of an individual experiencing a vehicle accident. The experience of a motor vehicle accident will need to be incorporated into a new schema, where 'vehicle accidents do happen, and while I have been fortunate not to have been involved in an accident before now and accidents might not involve me every day, they can happen to me'. These modified, more complex schemas provide extra protection for possible future stressors; one now recognises both intellectually and emotionally that victimisation is possible, so that, although schemas are often rebuilt as positive, they are less absolute in their positivity. Finally, the process of existential re-evaluation is theorised to result in increased appreciation of life as an element of growth. It is common for survivors of trauma to re-examine their priorities and what is of value in life. With the new realisation that loss is possible, value is placed on that which could be lost, and survivors will often commit themselves to ongoing recognition of that which they prioritise most in life. Life itself is valued more highly; everyday experiences are enjoyed more fully, others are appreciated more, and the value of one's life philosophy or faith is prized more highly.

Janoff-Bulman also suggests in her model that posttraumatic growth is one outcome of successful posttraumatic coping and that different processes lead to different domains of growth. For example, the struggle with suffering can produce feelings of personal strength; through coping with the pain, survivors may discover strengths of which they were previously unaware and they may develop new coping mechanisms and skills. Schema change may not be overly involved in this aspect of posttraumatic growth, as new views of self and strength may not substantially change one's prior assumptive worldview. In this way, individuals who are not particularly challenged by a trauma might still experience posttraumatic growth in the domain of the self.

#### ***1.4.4 Schaefer and Moos' (1992) model of coping responses in the posttraumatic growth process***

Schaefer and Moos' (1992) model examines how three particular responses to traumatic events influence the likelihood of an individual exhibiting posttraumatic growth after trauma. This is the only model that explicitly acknowledges the severity and timing of the trauma as influential in the process of posttraumatic growth. The three responses to traumatic events are appraisal, problem-focused coping, and emotion-focused coping. An individual appraises an adversity, defining and interpreting it. Problem-focused coping may give a sense of control over a stressor, or help to resolve it: such coping includes taking action or finding information. Emotion-focused coping entails managing emotional reactions to stressors – for example, regulating anger or accepting a situation; this can influence positive outcomes after crises. These coping responses are influenced by the severity and timing of the crisis; an individual's resources, such as intelligence, motivation, and self-efficacy; and environmental factors, such as an individual's living situation, finances, and relationships. Together these factors influence the likelihood of posttraumatic growth emerging. Approach coping rather than avoidant coping is emphasised as important for growth to occur.

#### ***1.4.5 Maercker and Zoellner's (2004) Janus-face model of posttraumatic growth***

The Janus-face model of posttraumatic growth proposes two faces of posttraumatic growth: a constructive component of growth that comprises functional change, such as heightened appreciation of the help offered by others, and a palliative component of growth that is illusory, functioning as a coping strategy. An example of positive illusions as a coping strategy may be feeling a vague sense of gaining maturity from an experience without a clear concept of how this maturity is manifest, while also showing apparent distress; the idea that an experience is somehow beneficial can soothe the experience of loss and also facilitate denial of distress. This strategy may be harmless in the long term if it is accompanied by cognitive processing of the trauma, or may be problematic if associated with avoidant coping that may impede processing the trauma. The Janus-face model assumes these two components of posttraumatic growth co-exist. The constructive side of growth is associated with long-term adjustment, whereas the illusory side may compensate for short-term emotional distress.

#### **1.4.6 Summary of models**

The comprehensive model of posttraumatic growth (Calhoun et al., 2010), the organismic valuing theory of growth through adversity (Joseph & Linley, 2005), Park and Ai's (2006) theory, Janoff-Bulman's (2006) theory, and Schaefer and Moos' (1992) model all view growth itself – the positive change after trauma – as a measurable, authentic change. These theories all elaborate on different elements of the posttraumatic growth process. Joseph and Linley's (2005) model is the only model to include posttraumatic stress disorder as a possible outcome from trauma. Maercker and Zoellner (2004) Janus-face model, described last, differs in that it proposes that posttraumatic growth also has an illusory aspect that serves to ease distress.

These models do not adequately specify how some individuals 'bounce back' to a pre-trauma state, indicating resilience. They have not yet been tested with resilient populations to ascertain their generalisability with individuals coping well after trauma. The models do not yet adequately specify which aspects of distress or individual differences might encourage or inhibit posttraumatic growth. For example, optimism, extraversion, and gender are not considered despite research indicating that such features influence posttraumatic growth. Further, the models do not consider how aspects of posttraumatic growth might influence the ongoing process of posttraumatic growth.

The current thesis will test current models of posttraumatic growth, in particular the comprehensive model of posttraumatic growth (Calhoun et al., 2010) and the organismic valuing theory of growth through adversity (Joseph & Linley, 2005), for a group of individuals coping well after trauma, to ascertain whether resilience influences the posttraumatic growth process and whether further contributors to the posttraumatic growth process need to be included in current models.

### **1.5 Posttraumatic growth and resilience**

Resilience is considered to be different from posttraumatic growth. Resilience is seen as an ability to manage adversity and continue with life after a trauma, or to live a purposeful life after adversity. Posttraumatic growth, however, entails not only an ability to resist adversity and continue functioning as before a trauma, but also a sense of transformation, with the individual moving beyond pre-trauma levels of functioning (Tedeschi & Calhoun, 2004). The

following section describes resilience research and considers resilience in light of Calhoun et al.'s (2010) comprehensive model of posttraumatic growth.

### ***1.5.1 A history of resilience research***

The history of resilience research illustrates the changing definitions of resilience over time. Additionally, resilience research began at the beginning of a wider research interest in positive psychology, and before posttraumatic growth research. Thus, lessons can be learned from the study of resilience when researchers are looking to study posttraumatic growth.

The construct of resilience has been conceptualised in various ways, including being the response to adversity in childhood (Masten & Tellegen, 2012), or being a character trait (Funder & Block, 1989). It has been suggested that resilience is both the process of positive coping and the outcome of better coping after trauma, depending on the duration of the trauma and the nature of the research questions; for example, 'How has an individual coped with a single event such as a flood?' relates to resilience as an outcome of coping, whereas 'How does a child cope with ongoing domestic chaos' relates to the process of positive coping (Mancini & Bonnano, 2010). Resilience has also been posited as a function of biology (Gillespie, 2009; Kim-Cohen, Moffitt, Caspi, & Taylor, 2004). It has been debated whether posttraumatic growth is related to resilience, is separate from resilience (Westphal & Bonanno, 2007), or whether it reflects one facet of resilience (Lepore & Revenson, 2006).

Initial research about resilience occurred in the course of examining psychopathology in children after trauma. Researchers noted that some children did not experience adverse consequences of trauma, whereas others did (Masten & Reed, 2002). Those who showed little disruption although they had experienced distressing events were described as invulnerable or hardy, intimating that they continued their lives unscathed. These terms have since been abandoned because they suggest that adverse events might have no negative impact at all for these children, and that such individuals may be able to withstand any kinds of stress, at any time in their lives. Findings from studying groups of children across stressors and timeframes have shown that this is not the case: children may cope well with a particular challenge at one time-point and not at another (Coie et al., 1993). Additionally, they may struggle in certain ways, such as experiencing increased anxiety in the face of a stressor, but not in other ways, such as engaging in substance abuse following a stressor (Luthar,



Doernberger, & Zigler, 1993). Further, Luthar, Cicchetti, and Becker (2000) noted that across all groups of children, including resilient children, each child shows varying levels of strength in different areas of functioning; for example, a child may excel in academic skills, whereas their competence in social skills is average. Thus, a person may show relative struggle in one area of functioning and competence in another; this is not by definition pathological and does not rule out resilience. Resilience was thus conceptualised as a lack of pathology in the face of high-risk circumstances, and research then centred on why children growing up in abusive, unpredictable, or neglectful backgrounds might develop into well-adjusted adults (Lepore & Revenson, 2006).

At this early stage of investigation, resilience was seen as a rarity – the exception to the rule – because resilience was being noted in the context of studying negative repercussions after trauma. However, resilience is much more common than once thought and proportions of resilient individuals often approach half of a population affected by adversity, as evidenced by studies examining depression in bereaved spouses. For example, research into depression in widows 2 months after the death of their partner showed that 49% of bereaved women had no depression, endorsing fewer than two criteria for depression from the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV-TR (Zisook, Paulus, Shuchter, & Judd, 1997). Such resilience does not preclude some yearning and intrusive cognitions soon after a loss; the resilient group, however, reported that these patches of yearning passed more quickly than for women with depression, and that they were still able to function and experience positive emotion (Bonanno, Wortman, & Nesse, 2004). Similarly, Ozer, Best, Lipsey, and Weiss (2008) noted in their meta-analysis of predictors of posttraumatic stress disorder that over half of adults report experiencing a traumatic event during their lives, yet only 8% of the population develop posttraumatic stress disorder; this suggests that many of those exposed to trauma either recover or are relatively unshaken by trauma.

Resilience was posited as a trait in early research, conceptualised as an ability to modify one's approach to a situation and its demands. Early researchers such as Funder and Block hypothesised that this ability to modify one's approach underlies characteristics such as resourcefulness, competency, and capacity to adapt to stressful situations (Funder & Block, 1989; Funder, Block, & Block, 1983). The difficulty with this view of resilience is that it is conceptualised as a latent characteristic, in the absence of any adversity. Mancini and

Bonanno (2010) argue that the concept of resilience must essentially include the element of exposure to adversity, as ‘resilient’ functioning must be in response to adversity; the capacity to maintain balance and adaptive functioning when confronted with stressful situations.

Additionally, the implicit assumption of defining resilience as a trait is that certain individuals will be more able to handle the adverse experiences that life brings, whereas others are characteristically more likely to experience adverse responses under this pressure. Luthar et al. (1993) asserted that resilience may manifest in one area of life and not another, indicating that particular individuals are not always more likely to struggle under pressure and others are not always more likely to excel. Additionally, recent research and programmes indicate that specific interventions such as ‘wellbeing therapy’ can increase resilience.

Wellbeing therapy focuses on building skills to pay attention to positive events, problem solve barriers to experiences of wellbeing, and build strategies for pursuing wellbeing (Fava & Tomba, 2009). Such research supports assertions that resilience is a malleable quality.

Mancini and Bonanno (2010) further explore whether the concept of resilience is suited to describing the *process* of coping with hardship, or the *outcome* of this coping. They note that the approach to resilience as a process of responding in an adaptive way to stressors comes from developmental research with children: stressful events entail ongoing adversity, such as poverty or maltreatment. In contrast, research with adult populations examines resilience as an outcome of coping with acute distressing events such as the loss of a loved one. As such, it appears that the view of resilience as a process or outcome differs mostly according to the duration of the stressor and the research questions asked of the specific population examined. The authors suggested that the underlying concept of resilience is the same in each scenario: an adaptive response to stressful life events. Other authors (Stevenson & Zimmerman, 2005) made a clearer definition of resilience as a process, explaining in their review of this field that resilience is often confused with positive adaptation or coping. To untangle these terms, the authors outlined that when an individual has successfully adjusted to a challenging situation (such as parents divorcing) with evidence of successful coping (such as social competence), this illustrates positive adjustment as the outcome of a resilient process. The process itself, of using resources and personal assets to overcome risk and adjust to such a change, is an illustration of resilience.

As research into resilience continued, research into the characteristics of resilient individuals was expanded to include factors within their immediate family context and within their community. It became clear that resilience is not merely a product of an individual's skills, temperament, or genetic make-up, but that it is influenced by dynamic external factors such as family relationships and availability of community support. An individual's characteristics, such as good cognitive abilities, easy temperament, and good emotional regulation, have been identified as relating to resilience. In the family context, dynamics including close relationships with caregivers, parental involvement in a child's education, and a parenting style with high warmth and high structure and expectations are noted to support a child's resilience. Resilience is likely to be supported by a complex interaction of person and context variables (Stevenson & Zimmerman, 2005). For example, both optimism and higher levels of social capital have been noted to relate to higher levels of resilience. Social capital here refers to the resources made available through the trusting and cooperative relationships between individuals. For example, supportive family relationships, or support from more formal organisations in the community such as clubs or religious organisations (Saegert, Thompson, & Warren, 2002) or better public health services (Masten & Reed, 2002). Optimists may be more approach-oriented and more attractive as potential friends, and therefore be more likely to build supportive social connections around them (Lepore & Revenson, 2006). Kim-Cohen et al. (2004) note that in the case of family units exposed to socioeconomic deprivation, mothers who were interpersonally warm, children who had outgoing temperaments, and family environments that were stimulating were all associated with more resilient responses. Given that temperament is assumed to be in part hereditary, the findings were interpreted to indicate that resilience could be both genetically influenced and nurtured by environment (Kim-Cohen et al., 2004).

### ***1.5.2 Varied definitions of resilience***

Definitions of resilience are centred on the concepts of adversity and adaptation to adversity (Fletcher & Sarkar, 2013). Definitions vary in part because, in assessing resilience, subjective judgement is needed regarding how an individual is faring compared to expectations of behaviour. Further judgement is required to classify whether a particular event would produce problematic behaviours in some people. Therefore, researchers must define their methods for measuring adaptation and the events considered a threat to adaptation.

### ***1.5.3 Assessing risks to wellbeing in the context of defining resilience***

Regarding the assessment of stressful circumstances that might pose a risk to wellbeing, many factors have been considered, including maltreatment, premature birth, poverty, homelessness, and parental illness. It has been noted that stressors accumulate over time and various stressors can predict similar problems as many such stressors can occur simultaneously. Thus, cumulative risk has often been assessed, using either measures of stressful life experiences or risk indices. Measuring risk consistently has challenged this field of research because of quandaries about whether to weight stressors differently; whether to include stressors that were initiated by the individual; whether to use subjective perceptions of stress or more objective judgement of stressful events; and whether to rely on self-report of life events (Masten & Reed, 2002). Luthar et al. (2000), however, suggested that the range of approaches to measuring resilience gives breadth and diversity of information on the nature of resilience. Although they agree that the variety of approaches to measuring risk, positive adjustment, and resilience might cause confusion, they argued that the different approaches give different information about the nature of resilience and that it is most important to outline how risk, resilience, and positive adjustment are measured in each case.

### ***1.5.4 Defining resilience for the participant sample in the current studies***

In light of the overview of resilience so far, it is important to outline how resilience is conceptualised for the current thesis. To summarise what has been discussed thus far: concepts of resilience have moved from assuming resilience is a rare trait to considering resilience as either a process of using available resources to adapt to aversive circumstances or as an outcome of successful coping. Resilience is considered to be a process when measured in the context of ongoing hardship (Mancini & Bonanno, 2010). In the context of the Canterbury earthquake sequence of 2010 and 2011, adversity included not only the earthquake events and ongoing aftershocks, but also continued hardship in housing circumstances and in dealing with insurance companies and the Earthquake Commission (EQC). At the time of data collection, it was very common for residents to be experiencing ongoing earthquake-related difficulties. Therefore, resilience for the current thesis should be considered a process of successful coping with stressful events.

In defining how risk to wellbeing and adjustment are conceptualised and measured in the current thesis, risks to wellbeing include exposure to earthquake-related events. These events

include experiencing the earthquakes and ongoing aftershocks, seeing injured individuals, seeing dead bodies, witnessing buildings falling, losing friends and loved ones, losing homes and possessions, dealing with damage to property, and communicating with insurance companies and the EQC (which can be stressful and unpredictable). Successful adjustment to adverse circumstances in the current thesis is considered the lack of psychological disorders developed after the earthquakes – that is, continued functioning as prior to the earthquakes. As such, for the current studies, a sample was recruited comprising individuals who were ‘coping well’ in spite of experiencing earthquake-related adversity. Potential participants were screened to ensure they had been exposed to earthquake-related events and that they had developed no psychological disorders after their experiences. Further, a measure of resilience was included to measure the levels of resilience in the participant sample.

#### ***1.5.5 Posttraumatic growth and its relation to resilience***

As noted previously, posttraumatic growth and resilience are considered to be conceptually different within posttraumatic growth research. Resilience is seen as maintenance of functioning in adversity, whereas posttraumatic growth is regarded as positive transformation because of the struggle with adversity (Tedeschi & Calhoun, 2004). Resilience is challenging to conceptualise as part of current models of posttraumatic growth, as research has not clearly shown how resilience and posttraumatic growth are associated. The little research conducted so far suggests that higher resilience (fewer symptoms of posttraumatic stress disorder) may prevent individuals from experiencing adverse events as challenging, and the process of posttraumatic growth may therefore not be activated (e.g., Levine, Laufer, Stein, Hamama-Raz, & Solomon, 2009). However, resilience has not been specifically measured in these studies, meaning that resilience has been assumed from lack of some forms of psychopathology, but not measured. Higher resilience also means that individuals are more likely to appraise a challenging situation and are more likely to seek social support and engage in rumination, which may then result in increased posttraumatic growth (Wilson, Morris, & Chambers, 2014). It is thus possible that more resilient individuals cope using different strategies, and that the process of posttraumatic growth is different in this population. Finally, it is possible, as Janoff-Bulman (2004) suggests, that some aspects of posttraumatic growth, such as an increased sense of personal strength, might result in some sort of preparedness for future traumas, adding to the resources that individuals can draw on

in future and thus building resilience. It is, therefore, conceptually possible that resilience curbs growth, encourages growth, or is an outcome of growth. Existing research has not examined this.

According to Lepore and Revenson (2006), resilience can be expressed in many ways and has three facets: recovery, resistance, and reconfiguration. In instances of recovery, resilience does not preclude distress and difficulty at the time of adversity, but it is said that this passes and the prior state of functioning is recovered. In the case of resistance, an individual is thought to remain unmoved when faced with adversity. Resistance may be part of a person's personality or make-up, or may have developed from previous adversity. For the final facet of resilience in this model – reconfiguration – the individual is buffeted by adverse conditions and changed as a result. These changes may or may not be adaptive in all circumstances; for example, a woman in the aftermath of an assault by an acquaintance may consider herself to have changed by trusting others less and being less naïve in her interactions with others. Although this may feel protective for her, this change could also diminish her capacity for intimacy and vulnerability in relationships in the future. In light of these illustrations of resilience, posttraumatic growth might be seen as a possible aspect of reconfiguration: a particular expression of resilience. Still, the concept of posttraumatic growth and resilience remain distinct, as posttraumatic growth entails positive transformation after trauma, whereas resilient individuals might not experience such transformation.

The association of growth and resilience is of interest because, conceptually, if individuals cope successfully with adverse events, they may be less threatened by events and less likely to have their worldviews challenged. As such, there may be less perception of stress and thus less engagement in aspects of the process of growth, such as working to make sense of their experiences. Thus, resilience may protect individuals from the circumstances that would produce growth (Westphal & Bonanno, 2007).

Others have suggested that the personal strength factor of posttraumatic growth reflects an aspect of psychological preparedness (Janoff-Bulman, 2004) and that this greater strength may contribute to less vulnerability to trauma in the future. Such implications are that in the aftermath of trauma, schemas are changed such that survivors are aware of their vulnerability to trauma, but also of their strength in facing it. An effect of this realisation is a decreased risk of terror when facing future tragedies. As such, it might be that the experience of growth

contributes to provide another resource (complex worldviews that are less vulnerable to trauma), which may improve resilience to future hardships. This possibility is reported by some studies in which participants reported drawing on prior experiences to cope with current stressors (Aldwin, Sutton, & Lachman, 1996).

Levine et al. (2009) examined the association of resilience and posttraumatic growth in a group of Israeli teenagers, civilians, and military personnel after exposure to terror events and war. Resilience was defined as the absence of posttraumatic stress disorder symptoms. The sample was heterogeneous in terms of the number of posttraumatic stress disorder symptoms. Participants were classified according to the number of posttraumatic stress disorder symptoms: in the first study 64% of teenagers had few posttraumatic stress disorder symptoms and were classified as ‘doubtful’ of gaining a diagnosis; 25% had ‘mild’ posttraumatic stress disorder; 10% had ‘moderate’ posttraumatic stress disorder; 4% had ‘severe’ posttraumatic stress disorder; and 1% had ‘very severe’ posttraumatic stress disorder. The presence of fewer posttraumatic stress disorder symptoms (conceptualised as greater resilience in this study) was associated with less posttraumatic growth, whereas having more symptoms of posttraumatic stress disorder was related to having higher levels of posttraumatic growth. These findings were interpreted as suggesting that resilience and posttraumatic growth are inversely related. Similarly, Lechner, Carver, Antoni, Weaver, and Phillips (2006) found that in a group of women with breast cancer, a subset of women showed both low levels of distress and low levels of growth. These women used fewer active coping strategies, less positive reframing, and less examination of their feelings. They also had less-advanced cancer and lower concern for damage to their bodies, and were less likely to have had chemotherapy. In this context, they may have had less cause for distress as they were less likely to perceive the cancer as a life crisis; therefore, they may have had fewer reasons to engage in the search for meaning associated with the growth process and they may have found fewer benefits to their experience, showing less growth. In line with these ideas, research with widowed spouses found that those with low rates of depression before and after their spouse’s death were less likely to struggle with or avoid their loss, and less likely to search for meaning associated with the loss (Bonanno, Wortman, & Nesse, 2004).

Importantly, resilience was not measured in any of these studies, but rather was formulated to be a characteristic of participants who showed few posttraumatic stress disorder symptoms. If

resilience does indicate different coping mechanisms in adversity, it is important to study posttraumatic growth in a sample of individuals coping well, where the likelihood of a more resilient sample is maximised, and where resilience can be specifically measured. In this way the extent and form of posttraumatic growth can be studied in resilient individuals.

More recently, a study of men after a diagnosis of prostate cancer used structural equation modelling to examine associations between resilience, measured by the Connor-Davidson Resilience Scale, posttraumatic growth, and common coping processes. Analysis showed that, although resilience and posttraumatic growth were not directly related, resilience predicted a higher likelihood that individuals would appraise the challenges set before them and view them as a challenge that they were competent to face. This then led to examination of core beliefs, which related to higher peer support and more intrusive rumination; in turn these factors predicted posttraumatic growth. Thus, resilience was related to a different approach to hardships. Posttraumatic stress disorder symptoms were not measured; however, the severity of intrusions and avoidance symptoms were noted. Participants endorsed varying numbers of posttraumatic stress disorder symptoms (Wilson et al., 2014).

In light of such findings, it appears that, although resilience and posttraumatic growth are conceptually different, the association between them may be complex. Resilience may mean that negative events are less challenging for an individual and give less cause to examine the meaning of the event in the place of one's worldview. In other scenarios, resilience may provide some of the coping resource needed to approach the challenges in one's life to reflect on their meaning and what one might learn from them, and this may lead to posttraumatic growth. It is not yet clear whether individuals coping well, and who are higher in resilience, might show signs of posttraumatic growth, or whether higher resilience precludes posttraumatic growth altogether. If those individuals coping well still show some kind of posttraumatic growth, the question remains as to whether it is similar in nature to the posttraumatic growth of individuals still suffering with posttraumatic stress disorder.

Considering where resilience might sit in the comprehensive model of posttraumatic growth (Calhoun et al., 2010) is therefore challenging. As a pre-existing influence, it is possible that resilience incorporates a flexible worldview that can more easily be modified to include new traumatic events, so that individuals are less likely to have their worldviews shattered and in need of rebuilding. Resilience would therefore mean that the process of posttraumatic growth



is less likely to be triggered. However, where an individual is challenged by a traumatic event, resilience may encourage more of an ‘approach’ tactic to solve difficulties brought about by the trauma. Higher resilience may indicate an individual is more likely to tackle the trauma by problem solving, seeking social support, and ruminating, leading to posttraumatic growth. Incorporating the trauma into pre-existing worldviews may make worldviews even more complex and flexible, perhaps building resilience to future traumas. Here, it is important to note Janoff-Bulman’s (2004) assertion that particular growth, such as a perception of the self as stronger, may emerge in the absence of specific challenges to worldviews. In this way it is possible that higher resilience allows an individual to experience posttraumatic growth in the domain of the self without having to rebuild assumptive worldviews if these worldviews have not been shattered.

#### ***1.5.6 Lessons learned from the field of resilience research***

It is clear that both resilience and posttraumatic growth play a role in adapting to trauma, and researchers such as Westphal and Bonanno (2007) have suggested that the study of resilience can inform likely angles of enquiry about the role of posttraumatic growth in adjusting to life after traumatic events. A lesson learned from resilience research is the importance of considering the nature of growth and being clear about whether the *process* of growth is being examined or whether growth is being measured as an *outcome* at one point in time. Tedeschi and Calhoun (2004) describe posttraumatic growth as being both a process and an outcome, with many factors influencing growth, interacting with growth, and being influenced by growth. The process may change over time and look different for different individuals. According to Park and Helgeson’s (2006) summary of research on posttraumatic growth, although most authors describe growth as an outcome, it is rare that research delineates the measurement of growth as either a process of coping with stressful life events or an outcome of this coping. This is something that researchers studying posttraumatic growth can consider. More recent research measures positive outcomes after trauma at different timeframes after stressful events, which adds to understanding the process and trajectory of growth (Marshall, Frazier, Frankfurt, & Kuijer, 2015).

In line with the idea of growth as both a process and an outcome, factors that correlate with growth can change during the process of growth. This is evidenced in studies of a range of North Americans after the terrorist attacks in Manhattan on September 11th 2001 (the 9/11

attacks). In the early stages after the attacks, growth was associated with more symptoms of posttraumatic stress disorder, as well as positive changes in worldview, denial, and less withdrawal from pursuing goals that were impeded by dealing with the trauma. Six months later, posttraumatic growth was predicted by initial growth scores, but higher levels of growth were also associated with increases in positive reframing, decreases in trauma symptoms, and increases in acceptance (Butler et al., 2005).

In the context of conceptualising posttraumatic growth as a process or outcome for the current study, it is useful to consider Mancini and Bonanno's (2010) suggestions for conceptualising resilience as process or outcome, depending on the nature of the trauma (discrete or ongoing). Just as resilience is considered to be a process when measured in the context of ongoing hardship, so might posttraumatic growth be considered as an ongoing process given the ongoing adversity after the Canterbury earthquake sequence of 2010 and 2011 (including the earthquake events and aftershocks, and individuals' continued hardship because of housing circumstances and dealing with insurance companies and the EQC). Findings will be examined to consider whether they support the conceptualisation of posttraumatic growth as a process.

Similarly, Westphal and Bonanno (2007) have noted two areas that may have implications for research about posttraumatic growth. First, some characteristics have been found both to bolster resilience and to be maladaptive in other circumstances – these authors have used the term 'pragmatic coping' or 'ugly coping' to describe such characteristics that have positive and negative repercussions. For example, self-enhancement biases have been found to support more positive perceptions of social relationships, whereas individuals high in self-enhancement received unfavourable ratings of their adjustment by outsiders. However, self-enhancement biases are also related to higher levels of resilience, indicating that individuals high in self-enhancement are unaware of the negative reactions they may provoke in others, and that this is protective for them (Bonanno, Field, Kovacevic, & Kaltman, 2002). Another study (Neckar, 2013) found that self-enhancement was related to coping with stressful events with little effort, but was also related to relying disproportionately on one's positive view of self, rather than assessing strengths and weaknesses more realistically and behaving in line with such an assessment. Further, flexible coping strategies and emotion regulation have been found to be associated with better adjustment: better-adjusted individuals can more

effectively control whether they express their emotions or suppress them in response to emotionally provoking scenarios (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004). This suggests that flexibility in coping styles and strategies may be more important for resilience than any particular coping style. Resilient individuals have been found to exhibit both ‘adaptive’ and ‘maladaptive’ coping styles, suggesting that investigating similar coping strategies in individuals exhibiting posttraumatic growth may be of interest. Additionally, flexibility of coping styles can be further explored alongside posttraumatic growth to ascertain whether flexibility also plays a role in promoting growth.

In summary, resilience and posttraumatic growth are conceptually related – both may reflect positive outcomes after trauma. Research about resilience predates research about posttraumatic growth, and the history of resilience research can inform research about posttraumatic growth. It appears that resilience and posttraumatic growth are separate constructs, and the association between them may be complex. Resilience may in some cases provide little opportunity or need for growth, perhaps as a result of core beliefs going unchallenged. Yet, in other cases, resilience may provide some of the coping resource needed to examine core beliefs or worldviews at the outset of the growth process.

The current research contributes to this important field by examining this complex association between posttraumatic growth and resilience. No research to date has explored the nature of posttraumatic growth in a sample of individuals coping well after trauma; the current thesis addresses the questions of whether resilient individuals endorse posttraumatic growth, whether resilient individuals might show particularly strong or weak growth in particular areas, and specifically how resilient individuals might perceive and report posttraumatic growth after a major earthquake sequence. It may be that resilient individuals perceive fewer challenges to their worldviews and express the majority of their posttraumatic growth in the domain of the self, perceiving themselves as stronger.

## **1.6 Assessing posttraumatic growth**

Growth has been measured in a variety of ways. Qualitative methods include interviews, focus groups, written essays, and life story techniques, whereas quantitative methods use validated scales such as the Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996), the Stress-Related Growth Scale (Park et al., 1996), and the Benefit Finding Scale (Antoni et al.,

2001). The Posttraumatic Growth Inventory is the most commonly used quantitative measure of posttraumatic growth (Ivtzan, Lomas, Hefferon & Worth, 2016).

Qualitative methods have the advantage of allowing participants to identify aspects of growth that are not specifically enquired about in quantitative surveys, such as possible adoption of health behaviours in HIV patients (Siegel & Schrimshaw, 2000); however, it is important that the wording of interview questions does not lead participants to answer in a certain way. For example, asking about positive changes only may give different information than asking about changes since a trauma.

Quantitative scales ask respondents to rate their growth according to a number of domains, on a Likert-type scale. The Posttraumatic Growth Inventory is a widely used measure of posttraumatic growth, used globally to measure positive changes of different traumas. The Posttraumatic Growth Inventory examines perceptions of positive change in five domains: Personal Strength, Appreciation of Life, Relating to Others, Spiritual Change, and New Possibilities. The Stress-Related Growth Scale includes questions about four domains: Changes in Social Relationships, Coping Skills, Life Philosophy, and Personal Resources. Neither measure correlates with measures of social desirability. The Benefit Finding Scale is designed to measure growth in populations with cancer.

Although quantitative scales are useful for measuring growth in a range of populations and circumstances, a limitation of the available scales is that there is no room for a participant to express a loss in a domain; for example, a person may perceive their relationships to have deteriorated, but the scales allow for only positive or no change. This has the potential to create a positive response bias and so it is important that researchers also give an opportunity to report negative changes. A second weakness with the existing scales is that they do not allow respondents to express that they already considered themselves as scoring highly on a domain prior to a trauma, with little room to gain in this regard. Although the concept of growth is still captured, it may mean that the interpretation of growth in association to other variables is confounded. For example, an individual with high perceived growth before a trauma may have a low growth score in comparison with an individual with perceived poor pre-trauma functioning in a domain who notes great positive changes after coping with a trauma (Park & Lechner, 2006). Thus, if growth scores are compared to measures of adjustment, for example, implications of findings are unclear.

Calhoun and Tedeschi (2006) suggest that an approach incorporating quantitative and qualitative methods would allow them to inform each other and give a greater understanding of the experience of the struggle with trauma. This approach would also allow the strengths of each method to compensate for the weaknesses of the other. Qualitative open interviews would allow a participant to report both positive and negative changes, as well as any other matters they deem pertinent. Quantitative methods allow aspects of posttraumatic growth to be measured and compared with different variables. To date, there is a paucity of mixed-methods research.

## **1.7 Factors related to posttraumatic growth**

Whether posttraumatic growth is ‘good’ or desirable is a common question. This section examines in detail the factors that are associated with posttraumatic growth, to illustrate that growth may be related to some desirable outcomes such as psychological wellbeing; however, it is not commonly recognised to relate to subjective wellbeing and some concepts of ‘adjustment’. Additionally, posttraumatic growth often co-exists with elements of distress, such as posttraumatic stress disorder, and thus does not mean an individual forgets their distress and enters a state of happiness (Ivtzan et al., 2016).

### ***1.7.1 Psychological wellbeing and physical wellbeing***

Calhoun et al.’s (2010) comprehensive model of posttraumatic growth suggests that posttraumatic growth leads to wellbeing and life satisfaction. However, in research, wellbeing has been conflated with psychological adjustment, and both have been conceptualised and measured differently by different researchers. As such, research examining the association of growth with positive adaptation yields equivocal results. Some research does report links between growth and adjustment (where adjustment is defined as lack of depression, anxiety, and anger; Carver & Antoni, 2004); some finds no association between growth and adjustment (where adjustment is operationalised as lack of impairment in daily functioning, more life satisfaction, and fewer psychological problems; Blix, Hansen, Birkeland, Nissen, & Heir, 2013); and some describes a curvilinear relationship, where low and high levels of posttraumatic growth relate to better psychological adjustment than moderate levels (adjustment is measured in this study as perceived quality of life, positive affect, and the absence of negative affect, social disruption, and intrusive thoughts; Lechner et al., 2006).

Several factors muddy the waters in interpreting the association between posttraumatic growth and adjustment: the inconsistency of conceptualising and measuring adjustment and wellbeing in this field of research, the use of different measures to capture growth, and the preponderance of cross-sectional rather than longitudinal studies make it difficult to tease out causal factors and possible mediator variables (Park, 1998). Psychological adjustment has been conceptualised as encompassing such constructs as positive affect, perceived quality of life, lack of social disruption, and lack of negative affect (Carver & Antoni, 2004; Lechner et al., 2006). Across research, adjustment has been measured using scales examining mood states (distress, self-esteem, life satisfaction, and positive affect), physical health outcomes (perceived quality of life, participants' ratings of their own health, and physical functioning), and psychological health (the absence of depression, social disruption, anxiety, intrusive-avoidant thoughts, and symptoms of posttraumatic stress disorder) (Helgeson et al., 2006). Given the varied ways positive adjustment to a crisis has been operationalised, it is not difficult to see how adjustment has also commonly been conflated with wellbeing. Conceptually, when psychological wellbeing and subjective wellbeing are differentiated from one another, subjective wellbeing has been described as positive affect, absence of negative affect, and satisfaction with life, whereas psychological wellbeing is considered as a combination of mastery, autonomy, existential engagement with life, and purpose (Durkin & Joseph, 2009). It is clear that this view of subjective wellbeing overlaps with concepts and measurements of adjustment.

Where the defining line has been drawn to examine how posttraumatic growth corresponds with both the subjective and psychological aspects of wellbeing, a stronger association of posttraumatic growth to psychological wellbeing (meaning and self-realisation) is found (Ryan & Deci, 2001). These findings are in line with Joseph and Linley's (2005) organismic valuing theory of growth through adversity, where posttraumatic growth relates to an increased sense of meaning in life but not necessarily to positive emotion.

Helgeson et al. (2006) conducted a meta-analysis of cross-sectional studies examining benefit finding (synonymous in Helgeson et al.'s study with posttraumatic growth) and wellbeing, and found that 'positive wellbeing' (self-esteem, positive affect, and life satisfaction) was related to growth. Measures of global distress that did not fit cleanly into a definition of anxiety or depression (such as measures profiling mood states without distinguishing between

positive and negative affect, anger, depression, anxiety, and other negative mood states) were unrelated to posttraumatic growth; however, experiencing intrusive–avoidant thoughts about the stressor was related to posttraumatic growth. The authors note that intrusive–avoidant thoughts are considered as markers of distress in some research, and in other studies as signs of cognitive processing that are necessary to make sense of a traumatic event and integrate its meaning into one’s life. In the context of intrusive thoughts as cognitive processing, it would make sense that this may be related to posttraumatic growth, because this may make up part of the cognitive work that needs to occur after an aversive experience that has shaken beliefs about the world and self. This concept is also in line with the organismic valuing theory of growth through adversity: intrusive cognitions occur with the struggle to comprehend a trauma. This struggle can lead to posttraumatic stress disorder if an individual has difficulty processing a trauma, but where an individual can successfully comprehend a trauma, cognitive and emotional intrusions cease. Importantly, this meta-analysis did not differentiate between posttraumatic growth and benefit finding, thus obscuring any differences between studies that may have defined benefit finding and posttraumatic growth differently. Although related, benefit finding and posttraumatic growth are different constructs, where benefit finding describes the process of identifying positive elements of one’s difficult experiences, and posttraumatic growth refers to the positive psychological changes that occur after the struggle with a trauma (Aspinwall & Tedeschi, 2010; Mols et al., 2009; Sears et al., 2003). Benefit finding and posttraumatic growth may have different associations with other constructs.

The passage of time influences the association of posttraumatic growth and wellbeing. Helgeson et al.’s (2006) meta-analysis found, for example, that after 2 years, benefit finding was related more strongly to less depression and more positive wellbeing, whereas prior to 2 years, benefit finding was related more strongly to higher global distress and lower anxiety. A further meta-analysis (Sawyer, Ayers, & Field, 2010) on posttraumatic growth after cancer and HIV/AIDS examined the association of posttraumatic growth and positive adjustment (positive affect, mental health, or measures of wellbeing such as life satisfaction), negative adjustment (general distress or symptoms of disorders such as depression, anxiety, or posttraumatic stress disorder), and physical health (functional ability, general physical health, or physical symptoms). In these 38 studies, posttraumatic growth related to higher positive

adjustment, lower negative adjustment, and higher levels of physical health. However, time since the trauma moderated the association of posttraumatic growth with positive psychological adjustment. A longer time since trauma showed a stronger association between posttraumatic growth and positive adjustment. Age was also a moderator: younger age related to a stronger association between posttraumatic growth and positive psychological adjustment. Last, samples with higher levels of minority ethnicities showed a stronger association between posttraumatic growth and positive psychological and physical health. Taken together, findings show that time is a clear moderator of the association between posttraumatic growth and wellbeing; this is not explicitly outlined in models of posttraumatic growth, but implicitly acknowledged when posttraumatic growth is described as an ongoing process, rather than a static outcome of coping with adversity (Calhoun et al., 2010). Other aspects such as age and ethnicity influence the model's association between posttraumatic growth and wellbeing and could be more explicitly noted in models of posttraumatic growth.

The comprehensive model of posttraumatic growth (Calhoun et al., 2010) and the organismic valuing theory of growth through adversity (Joseph & Linley, 2005) outline that posttraumatic growth exists alongside more negative perceived consequences of trauma, and this is supported by research findings (Park & Helgeson, 2006; Tedeschi & Calhoun, 1995). As such, if adjustment is conceptualised as a lack of negative psychological repercussions from trauma, this may not allow researchers to note the complex interplay of negative and positive factors after a trauma. Although a stressor can produce increased feelings of vulnerability and distress, this can occur at the same time as an increase in positive feeling; growth does not necessarily have to exist outside of ongoing difficulty. For example, breast cancer survivors at 5 years and 10 years after diagnosis reported finding meaning in their experiences, which was associated with positive emotions, whereas they also reported feeling more vulnerable, which was associated with negative emotions (Bower et al., 2005). Both perceptions of meaning and feelings of vulnerability were associated with increased life disruption caused by the cancer experience (more invasive treatments and more physical symptoms).

Blix et al. (2013) reported that posttraumatic growth did not relate to adjustment. They examined adjustment in a group of individuals affected by the Oslo bombings in Norway in 2011, using a cross-sectional study design. Measuring adjustment as lack of disruption to



daily functioning, life satisfaction, and fewer psychological problems, there was no association between posttraumatic growth and adjustment, and the authors concluded that there was no adaptive value for posttraumatic growth. However, where individuals had more symptoms of posttraumatic stress disorder, posttraumatic growth related to higher life satisfaction. Such findings indicate that posttraumatic growth might be associated with adjustment to difficulties in some situations, perhaps working to ease co-occurring distress.

It is also possible that different domains of posttraumatic growth are related to different elements of adjustment. Complex associations among domains of posttraumatic growth, quality of life, and anxiety have been noted. In Silva, Crespo, and Canavarro's (2012) study of women with breast cancer at three time-points – 1 day before surgery, 5 months later, and 6 months after that – they measured coping strategies, psychological 'quality of life' (positive feelings, self-esteem, and spirituality or philosophy), and posttraumatic growth. Over the course of the study, coping strategies (seeking social support) and cognitive strategies (acceptance, humour, making plans, and reframing) influenced the perception of developing personal resources and skills to cope with the stress of experiencing cancer, which facilitated posttraumatic growth. This then related to decreased depression and anxiety and increased psychological quality of life 1 year later. In particular, cognitive coping at Time 1 was associated with better adjustment (lower depression and anxiety and higher psychological quality of life), but social support seeking was not. Cognitive coping was associated with one domain of posttraumatic growth: the development of personal resources and skills. Social support seeking was associated with three domains of posttraumatic growth: developing personal resources and skills; strengthening relationships; and appreciating life and new possibilities. On closer examination, developing personal skills and resources at Time 2 mediated the association between cognitive coping at Time 1 and decreased depression at Time 3, and mediated the association between social support seeking at Time 1 and psychological quality of life at Time 3. It appears that successful coping, where individuals can gain a sense of skill and increased resources through their difficulty, can lead to posttraumatic growth and encourage adjustment (Silva, Crespo, & Canavarro, 2012). A shortcoming of Silva, Crespo, and Canavarro's study, in understanding differences in elements of adjustment, is that 'psychological quality of life' included positive emotions, self-esteem, and meaning in life or spirituality, so that combining these three facets may

mask any particular differences in the association among these variables, coping strategies, and domains of posttraumatic growth. However, the study does indicate that posttraumatic growth can have an indirect influence on elements of adjustment, such as positive emotions, self-esteem, and meaning in life, through a sense of personal skill that is influenced by using cognitive strategies such as humour, making plans, reframing, and acceptance, and behaviours such as seeking social support. In the framework of the organismic valuing theory of growth through adversity (Joseph & Linley, 2005), it may be that humour, reframing, acceptance, and seeking social support were commonly chosen as strategies to employ in the search for the significance of a trauma, leading to positive accommodation of the trauma: posttraumatic growth. In the comprehensive model of posttraumatic growth (Calhoun et al., 2010), these cognitive and behavioural strategies may fit under the constructive rumination stage and the social support influence on this, where individuals work to find meaning in their experience.

It is clear that posttraumatic growth has associations among different aspects of adjustment or wellbeing over time. Additionally, posttraumatic growth can also co-exist with some elements of distress, such as anxiety, so that if adjustment is conceptualised as a lack of psychological difficulty after a trauma, it may seem that posttraumatic growth does not predict adjustment. In light of these associations with positive and negative factors, it is interesting to note that acknowledging both the positive and negative experiences in one's situation can support an association between posttraumatic growth and adjustment. Where a balanced appraisal of a situation is held, benefit finding appears to relate to higher self-worth and more abundant social support. Cheng, Wong, and Tsang (2006) examined individuals who acknowledge both benefits and costs resulting from their experiences with contracting severe acute respiratory syndrome (SARS) or having a loved one contract SARS. Benefits, for example, included perceiving the self as having grown and appreciating others, and costs included personal weakness and social distancing from others. Those who acknowledged both costs and benefits exhibited increased psychosocial resources 6 months later (higher self-esteem and higher levels of received social support), whereas those who only acknowledged benefits showed reduced psychosocial self-esteem and reduced received social support 6 months later. Thus, recognising both difficult and positive aspects of a challenge may aid the meaning-making process after a trauma because of a willingness to engage with

all aspects of its outcome. Additionally, social support could be more forthcoming because supportive others are more willing to engage with or support a survivor who acknowledges difficulty as well as positive outcomes. Such a balanced appraisal fits nicely into Joseph and Linley's organismic valuing theory of growth through adversity, illustrating a consideration of all aspects of a trauma in reconstructing a new worldview. Acknowledgment of the positive and negative aspects of one's situation might add to Calhoun et al.'s (2010) model of posttraumatic growth by adding to influences on the self-reflection or rumination process in individuals who are coping well.

Some psychological factors, such as optimism and posttraumatic growth, appear to interact in affecting physical health outcomes. In the light of Calhoun et al.'s (2010) model, optimism may be a pre-existing individual difference in appraisal of events and the future that influences responses to an adverse event. It is possible that realistic optimism (showing a balanced appraisal of one's situation and holding reasonable expectations of outcomes), works with posttraumatic growth to boost physical health. Milam (2004) examined optimism and pessimism, posttraumatic growth, and disease progression (using viral load and CD4 T cell counts) in a sample of individuals living with HIV at two time-points: baseline (when recruited for the study through a clinic) and 16–20 months later. Posttraumatic growth was related to lower viral load at both time-points, lower pessimism, higher optimism, and lower depression. When posttraumatic growth and physical health were examined in light of optimism and pessimism, an intriguing pattern emerged. Viral load was inversely related to posttraumatic growth in the case of low pessimism, and positively related to viral load in participants with high pessimism. Higher CD4 counts were related to lower levels of optimism, and lower CD4 counts were related to higher optimism. The authors surmise that posttraumatic growth has the most positive effect on physical health when an individual has few expectations regarding the outcome of their situation.

In summary, posttraumatic growth does relate to aspects of wellbeing such as meaning in life, self-esteem, and positive affect, but this association emerges over time. The association between posttraumatic growth and wellbeing is also strengthened by factors such as minority ethnicity, younger age, and a more balanced acknowledgement of the positive and negative aspects of a situation. The little existing research on posttraumatic growth and physical health suggests that posttraumatic growth relates to higher levels of physical health in samples with

realistic levels of optimism and in samples with a higher percentage of minority ethnicities. Aspects of posttraumatic growth can be encouraged by some cognitive and behavioural strategies, and domains of growth can encourage positive affect, self-esteem, meaning in life, and received social support. The interplay between cognitive and behavioural strategies, posttraumatic growth, and adjustment is not yet well understood. In part this is because there are varied conceptualisations and measurements of adjustment as quality of life, positive affect, or absence of negative affect. It also appears that certain domains of posttraumatic growth relate to separate elements of adjustment.

Findings from research that positive emotions can relate to posttraumatic growth and also co-exist with negative psychological factors after a trauma are in line with Calhoun et al.'s (2010) comprehensive model of posttraumatic growth and the organismic valuing process of growth through adversity (Joseph & Linley, 2005). An explicit component of time could be included in existing models so that it is clearer that over time the association between factors in the posttraumatic growth process changes. Individual differences, such as younger age and minority ethnicity, could be included as moderating components in the association between posttraumatic growth and wellbeing. Particular cognitive strategies might be linked to different domains of posttraumatic growth, so that it is noted that, for example, humour, planning, reframing, and accepting are linked to an increased sense of personal skill (an aspect of posttraumatic growth in seeing oneself as stronger). This increased sense of skill then leads to wellbeing, in particular positive emotions, self-esteem, and meaning in life.

### **1.7.2 Distress**

In all models of posttraumatic growth, distress is proposed as part of the posttraumatic growth process in response to trauma. Distress triggers cognitive and emotional processing, which can then lead to posttraumatic growth, so that distress indirectly leads to posttraumatic growth. Conceptually, it is possible that posttraumatic growth can occur in cases of trauma with low distress, where cognitive and emotional processing still takes place.

In research, depending on the way distress is conceptualised, findings have shown posttraumatic growth to be inversely related to distress (Frazier et al., 2001), positively related to distress (Solomon & Dekel, 2007), and independent from distress (Morris & Shakespeare-Finch, 2011).

Distress has been measured in a variety of ways, most often as posttraumatic stress disorder symptoms, but also with measures of the perceived stressfulness of the event, impact of the trauma, objective and subjective measures of stress, depression, anxiety, hostility, or global distress (measured by a variety of scales of affect and distress such as the Symptom Checklist-90 (Derogatis, 1994) that examines such constructs as somatisation, obsessive-compulsive traits, interpersonal sensitivity, depression, anxiety, and hostility) (Helgeson et al., 2006). Linley and Joseph's (2004) review of studies examining posttraumatic growth reported mixed findings for the association between distress (depression, anxiety, and posttraumatic stress disorder) and posttraumatic growth, in cross-sectional studies. However, the amalgamation of a broad range of measures as reflecting 'distress' may mean that the associations between specific distress variables and posttraumatic growth are lost in a review.

Different expressions of distress are examined separately below in detail. Overall, research trends suggest that posttraumatic growth can co-exist with posttraumatic stress disorder, and is often higher in individuals with more symptoms of posttraumatic stress disorder.

Posttraumatic growth does not appear to be directly related to posttraumatic stress disorder but may have shared causal factors. Peritraumatic distress has a clearer linear or curvilinear association with posttraumatic growth, such that greater peritraumatic distress engenders greater posttraumatic growth. Posttraumatic growth may have a buffering effect on concurrent depression, whereas the relationship with anxiety is still unclear. Higher objective severity of trauma and perceived threat from trauma are generally related to higher levels of posttraumatic growth. Last, the few studies that have examined prior coping with stressors and current posttraumatic growth suggest that the number of previous stressors does not contribute to posttraumatic growth. Life stressors may, however, contribute to resilience where an individual considers themselves to have coped well with the stressor.

#### *1.7.2.1 Symptoms of posttraumatic stress disorder*

Symptoms of posttraumatic stress disorder are used in many studies as an indication of ongoing distress following a traumatic event. Again, findings on the nature of the associations between posttraumatic growth and posttraumatic stress disorder are mixed: research suggests that symptoms are positively related to posttraumatic growth; that symptoms show a curvilinear association to posttraumatic growth such that moderate (as opposed to low or high) posttraumatic stress disorder symptoms predict higher posttraumatic

growth; that posttraumatic stress is eased by posttraumatic growth; or that early posttraumatic growth predicts later posttraumatic stress disorder symptoms. Findings differ according to type of trauma, whether the study is cross-sectional or longitudinal, and whether posttraumatic stress disorder symptoms or the presence or absence of a diagnosis of posttraumatic stress disorder is used. Overall, it appears that posttraumatic stress disorder and posttraumatic growth have shared predictors so that they can co-exist but are not always found to relate to each other.

In cross-sectional studies where symptoms of posttraumatic stress disorder are measured, clusters of some posttraumatic stress disorder symptoms were found to relate to posttraumatic growth. For example, in a sample of Australian university students experiencing a range of traumas, higher trauma severity and higher levels of intrusions (intrusive thoughts, feelings, images, and dreams) about the trauma were related to higher levels of posttraumatic growth (Morris, Shakespeare-Finch, Rieck, & Newbery, 2005). Intrusions about the trauma were measured by the Impact of Event Scale - Revised (D. S. Weiss, 2004). Conversely, a recent review of 24 cross-sectional studies examined the presence of posttraumatic stress disorder (instead of symptoms and clusters of symptoms of posttraumatic stress disorder) and posttraumatic growth as measured by the Posttraumatic Growth Inventory in women with breast cancer. Posttraumatic stress disorder and posttraumatic growth were not related (Koutrouli, Anagnostopoulos, & Potamianos, 2012). Cordova et al. (2007), also found no association between posttraumatic stress disorder and posttraumatic growth. However, all of these studies examined only potential linear relationships between posttraumatic growth and other variables, and it is possible that testing for curvilinear associations may have shown some association between posttraumatic growth and posttraumatic stress disorder.

Where posttraumatic stress disorder symptoms are measured, curvilinear associations between symptoms and posttraumatic growth have been noted in a number of studies. A meta-analytic review of 42 studies examining the association between posttraumatic growth and posttraumatic stress disorder symptoms reported that, across the studies, there was a linear association between posttraumatic stress disorder and posttraumatic growth, such that more symptoms were related to higher posttraumatic growth. However, there was a stronger curvilinear association between posttraumatic stress disorder and posttraumatic growth, the strength of which varied according to type of trauma and age (Shakespeare-Finch & Lurie-

Beck, 2014). A strong curvilinear association between posttraumatic stress disorder and posttraumatic growth was found in survivors of natural disasters and civilians in conflict zones, whereas no association was found in those affected by sexual abuse or ill health. These findings are consistent with the study by Koutrouli et al. (2012), where a low occurrence of posttraumatic stress disorder was found in survivors of breast cancer, and posttraumatic growth was commonly noted, yet posttraumatic stress disorder and posttraumatic growth were not related. Studies with children also showed a stronger curvilinear association than that found in studies with adults. The curvilinear association found in some studies suggests there may be an optimum level of disruption that encourages growth; too little distress and there is less need to grapple with the meaning and place of the trauma in one's life; too much distress, and it may overwhelm one's coping abilities. It is also clear that the nature of posttraumatic growth differs according to the trauma, and therefore relates differently to any posttraumatic stress disorder symptoms experienced.

Few longitudinal studies have examined the association of posttraumatic growth with posttraumatic stress disorder, and again, findings are mixed. Longitudinal studies report that a) posttraumatic stress disorder and posttraumatic growth are unrelated (Salsman et al., 2009); b) where posttraumatic stress disorder symptoms decrease over time after a trauma, this relates to higher posttraumatic growth (Butler et al., 2005); c) posttraumatic growth years after a trauma relates to concurrent posttraumatic stress, but does not relate to posttraumatic stress measured soon after a trauma (Holgerson, Boe, & Holen, 2010); or d) symptoms of posttraumatic stress disorder predict posttraumatic growth years later (Dekel, Ein-Dor, & Solomon, 2012).

Salsman et al. (2009) measured posttraumatic growth and posttraumatic stress disorder symptoms in 55 survivors of colorectal cancer at two time-points: an average of 13 months post-diagnosis and 3 months later. No association between posttraumatic stress disorder and posttraumatic growth was found. However, the interval may not have allowed enough time between the two measurements for participants' experiences of posttraumatic stress disorder symptoms and posttraumatic growth to change much; further assessment and extended timeframes may have better captured greater variation in the number of posttraumatic stress disorder symptoms and a stronger association with posttraumatic growth. Additionally, the

sample size in the study was relatively small, possibly missing existing associations between posttraumatic growth and posttraumatic stress disorder because of a lack of statistical power.

Two studies have found initial benefit finding to predict fewer posttraumatic stress disorder symptoms at a later time, but both have used a vague measure of benefit, such as a single item enquiring about positive changes after a trauma. For example, in their research with survivors of three different disasters, McMillen et al. (1997) found that perceiving benefits soon after a disaster predicted lower rates of posttraumatic stress disorder as the severity of the disaster increased. Conversely, in the case of those who perceived little benefit, the rates of posttraumatic stress disorder at a 3-year follow-up increased as disaster severity increased. However, this study used a single question to enquire about positive change: whether or not any positive change was perceived as coming from experiences of the disaster. It is not clear how these findings might relate to posttraumatic growth measured using a well-validated scale such as the Posttraumatic Growth Inventory, which would be able to indicate further nuances of how levels of posttraumatic growth might relate to levels of posttraumatic stress disorder in the longer term. Similarly, in another longitudinal study, Davis et al. (1998) examined the efforts individuals expended to 'make sense' of a traumatic event within their existing worldviews (e.g., attributing the reason for an event to the plan of a higher power, or taking some personal responsibility for the event, or attributing an event to different causal factors such as lifestyle). They measured making sense and benefit finding separately in individuals who had lost a family member, and concluded that they were likely separate parts of the grieving process, associated with different variables. Making sense, distress (depression and posttraumatic stress disorder symptoms), and benefit finding were measured before the loss, 6 months, 13 months, and 18 months post-loss. The authors noted that making sense of the loss was associated with less depression and fewer posttraumatic stress disorder symptoms 6 months after the death of a family member, and that finding benefits at 6 months was more strongly associated with less depression and fewer posttraumatic stress disorder symptoms at 13 and 18 months post-loss. They suggested that, although benefit finding and meaning making were as commonly reported 6 months after a loss, benefit finding had more of an impact in the long term, relating to lower rates of depression and posttraumatic stress disorder symptoms. This study again used a single interview question to measure benefit finding, asking whether a participant could identify any positive outcomes



from their experiences. Participant responses were rated 'yes', 'no', or 'ambiguous' (where participants showed they were considering possible benefits but no conclusion had yet been reached). Whether or not an individual perceived benefits may not map accurately onto the construct of posttraumatic growth, and future research using a more comprehensive measurement of posttraumatic growth would enable the examination of its association with later rates of posttraumatic stress disorder and depression. Additionally, making sense of an event and benefit finding may be parts of a process that contribute to posttraumatic growth, but are not synonymous with it. Making sense of a loss is a task that is completed as part of the grieving process, but may not necessarily lead to posttraumatic growth as a matter of course.

One study, which found that posttraumatic growth related to fewer posttraumatic stress disorder symptoms, used a validated, widely used measure of posttraumatic growth: the Posttraumatic Growth Inventory. Posttraumatic growth and posttraumatic stress disorder symptoms were measured in 1,505 North Americans after the 9/11 terrorist attacks at two time-points: 9 weeks after the attacks and 6 months later (Butler et al., 2005). Early posttraumatic growth was found to predict levels of later posttraumatic growth, and posttraumatic growth was found to decrease over time. However, higher levels of posttraumatic growth at Time 2 were related to decreased posttraumatic stress disorder symptoms from Time 1, and increased attitudes of acceptance, positive reframing, and positive worldviews. Such findings indicate that the association between posttraumatic stress disorder and posttraumatic growth over time is complex and likely involves cognitive and coping variables. These findings cannot be interpreted to suggest that a decrease in posttraumatic stress disorder symptoms relates directly to higher posttraumatic growth, as posttraumatic stress disorder and posttraumatic growth may be following different trajectories.

One longitudinal study has been interpreted as suggesting that higher posttraumatic growth compensates for a higher number of posttraumatic stress disorder symptoms. After an oil-rig disaster, 47 men were assessed for posttraumatic stress disorder symptoms at three time-points: 1 year, 7 years, and 27 years after the disaster. The Posttraumatic Growth Inventory was used to measure posttraumatic growth 27 years after the disaster. Associations were examined between posttraumatic growth 27 years post-disaster and posttraumatic stress

disorder at the three time-points post-disaster. Posttraumatic growth 27 years post-disaster was related to concurrent posttraumatic stress disorder, but not to posttraumatic stress disorder measured 1 year after the disaster. The authors concluded that posttraumatic growth was a response to current distress rather than distress experienced at the time of the disaster (Holgersen et al., 2010). As this study had a small sample size, power may not have been sufficient to detect possible associations between initial posttraumatic stress disorder and later posttraumatic growth.

Three longitudinal studies have found patterns suggesting that posttraumatic growth is a response to posttraumatic stress disorder symptoms, but not vice versa. Dekel et al. (2012) measured posttraumatic stress disorder symptoms and posttraumatic growth in Israeli ex-prisoners of the Yom Kippur War in 1973, and in matched controls. Measures were taken in 1991, 2003, and 2008 for posttraumatic stress disorder and in 2003 and 2008 for posttraumatic growth. Although both posttraumatic stress disorder symptoms and posttraumatic growth levels were stable across time, they found that posttraumatic stress disorder symptoms in 2003 predicted posttraumatic growth in 2008 more reliably than initial posttraumatic growth scores. Depression and anxiety did not predict posttraumatic growth scores. Additionally, those veterans meeting criteria for posttraumatic stress disorder reported higher levels of posttraumatic growth. Interestingly, the posttraumatic stress disorder symptom that best predicted posttraumatic growth was the level of hyperarousal; authors speculated that the increased energy that embodies hyperarousal may have aided social participation rather than encouraged avoidant behaviours. These findings could indicate that posttraumatic growth is a response to posttraumatic stress disorder symptoms as the authors speculate; the findings could also signify that where an event is sufficiently traumatic to produce hyperarousal symptoms years later, it also produces some elements of posttraumatic growth.

Second, Zhou, Wu, and Chen (2015) examined posttraumatic growth and posttraumatic stress disorder in 245 adolescent survivors of the 2008 Wenchuan earthquake. Measured at three time-points (3.5 years; 4.5 years; and 5.5 years post-earthquake), higher numbers of posttraumatic stress disorder symptoms at 3.5 years and 4.5 years predicted higher posttraumatic growth at 4.5 years and 5.5 years post-earthquake. Posttraumatic growth did not predict posttraumatic stress disorder symptoms. Such findings in a large group of

survivors suggest that posttraumatic stress disorder drives posttraumatic growth; however, the cross-sectional association between posttraumatic stress disorder and posttraumatic growth weakened over time, suggesting again that, although posttraumatic growth and posttraumatic stress disorder are related, this association is complex and changes over time. Further supporting this hypothesis, it is likely that factors such as dispositional and situation-specific optimism contribute, alongside greater posttraumatic stress disorder symptoms, to greater posttraumatic growth. In a longitudinal study with 258 individuals exposed to community violence, higher trauma-related distress at the time of hospitalisation for injuries from attacks (measured as posttraumatic stress disorder symptoms), dispositional optimism, and situation-specific optimism that some good could come of the traumatic situation predicted higher levels of posttraumatic growth 3 months later (Updegraff & Marshall, 2005).

Research showing different associated variables for posttraumatic stress disorder and posttraumatic growth indicates that different pathways to posttraumatic growth or posttraumatic stress may exist. As Linley and Joseph (2004) proposed, both posttraumatic growth and posttraumatic stress disorder may be elements of adjustment to trauma that can co-occur, while being distinct constructs. Taku, Calhoun, Cann, and Tedeschi (2008) studied the role of rumination related to posttraumatic growth and distress (measured as symptoms of posttraumatic stress disorder: intrusions, hyperarousal, and avoidance) in bereaved Japanese university students who had lost a loved one between 2 months and 5 years prior to assessment. They used a cross-sectional design and found that distress and posttraumatic growth co-existed and that styles of rumination (deliberate and intrusive) related differently to posttraumatic growth and distress. Deliberate rumination soon after the loss was related to posttraumatic growth, whereas recent intrusive rumination was related to increased distress. Three models were tested against the data: a) that posttraumatic growth and distress were not related; b) that posttraumatic growth and distress were related, and co-exist; and c) that posttraumatic growth and distress co-exist, but distress leads to posttraumatic growth. Using structural equation modelling, the model that best fit the data indicated that distress predicted growth. Distress existed alongside growth, but growth did not appear to dampen the distress of bereavement.

In this vein, recent research has indicated that posttraumatic stress disorder and posttraumatic growth share some predictor variables, while differing on others. Former Israeli prisoners of

the Yom Kippur War were assessed in 1991 and 2003. In 1991, sociodemographic variables, exposure to trauma, reactions to trauma, personality factors, social support, and world assumptions were measured; in 2003, posttraumatic growth and posttraumatic stress disorder were measured. Two factors predicted both posttraumatic stress disorder and posttraumatic growth: active coping in captivity and loss of a sense of control over emotions (extreme fear and a feeling of losing one's mind). Other factors predicted either posttraumatic stress disorder or posttraumatic growth, but not both. For example, captivity experiences and the assumption of self-controllability predicted posttraumatic growth, when controlling for posttraumatic stress disorder. In regards to posttraumatic stress disorder, those younger and less educated reported higher rates of posttraumatic stress disorder, and higher ratings of suffering in captivity related to more reported posttraumatic stress disorder symptoms (Dekel, Mandl, & Solomon, 2011). As such, posttraumatic stress disorder and posttraumatic growth may both be triggered by a traumatic event, but are separate constructs to some extent. The authors suggest that a trauma can trigger a loss of control, shattering assumptions about the world; when this grows into a sense of self-controllability, posttraumatic growth can result, whereas when there is no perception of the ability to control oneself, this may result in posttraumatic stress disorder. Such a sense of self-control can easily be included as a factor in Joseph and Linley's (2005) organismic valuing theory of growth through adversity, as an element that influences whether a person develops posttraumatic growth or posttraumatic stress disorder after trauma.

Additionally, Morris and Shakespeare-Finch (2011) used structural equation modelling in a cross-sectional study of cancer survivors at an average of 3 years post-diagnosis. They examined the association between trauma severity, posttraumatic stress disorder symptoms, social support, and posttraumatic growth. They found that trauma severity and posttraumatic growth were not directly related. However, trauma severity was associated with distress and social support. Social support was directly related to posttraumatic growth and to rumination (intrusive rumination, rumination on life purpose, and rumination on benefits). Deliberate rumination was related to posttraumatic growth directly, whereas life-purpose rumination and intrusive rumination were associated with more posttraumatic stress disorder symptoms. These findings suggest that different elements of an individual's reaction to a cancer are

associated with distress and with growth. Easing distress will not necessarily influence growth, and encouraging growth may not reduce distress.

In summary, although it is clear that posttraumatic growth and posttraumatic stress disorder symptoms co-exist and are related in some ways, the nature of this association is not yet understood. This lack of clarity is because of a paucity of studies using longitudinal designs with well-validated measures of posttraumatic growth, a tendency to neglect testing for curvilinear effects in cross-sectional studies, and different approaches to classifying posttraumatic stress disorder according to number of symptoms or a diagnosis of posttraumatic stress disorder. Although it appears that posttraumatic stress disorder symptoms relate to posttraumatic growth at a later point in time, there are likely other variables associated with posttraumatic growth and posttraumatic stress disorder that change across time. The difficulty with drawing conclusions from post-trauma studies is that both posttraumatic stress disorder and posttraumatic growth are possible responses to a trauma, and are not mutually exclusive; posttraumatic growth may develop over time as individuals recover from the immediate distress of a trauma and make sense of it in the context of their worldview. Posttraumatic stress disorder symptoms may not cause posttraumatic growth, but may be another possible effect of experiencing a life-threatening event. Indeed, it is useful to consider these studies in the context of research showing that the more stressful an event is perceived to be, and the more stressful an event is objectively judged to be (e.g., later stages of cancer), the higher the expressed posttraumatic growth.

Existing models of growth are not explicit about how posttraumatic growth might relate to symptoms of posttraumatic stress disorder. Joseph and Linley's (2005) organismic valuing theory of growth through adversity posits that posttraumatic stress disorder emerges from difficulties processing cognitive and emotional aspects of a trauma, yet posttraumatic growth emerges from effectively processing a trauma cognitively, and then moving on to search for positive sequelae of the trauma. A shortcoming of this model is that it does not allow for posttraumatic stress disorder symptoms and posttraumatic growth to co-exist, and that distress is not merely a trigger to instigate the process of posttraumatic growth.

#### *1.7.2.2 Peritraumatic distress*

Many studies report that more distress experienced during a trauma (peritraumatic distress) and higher reported severity of a trauma predict posttraumatic growth. For example, in a sample of bereaved HIV/AIDS caregivers, more distress experienced in relation to their loss, along with higher reported personal spirituality and higher levels of social support, were associated with more posttraumatic growth (Cadell, Regehr, & Hemsworth, 2003). Similarly, Wild and Paivio (2003) examined a group of university students who had experienced a range of traumas, and asked them to rate the level of distress they experienced as a result of the trauma on a 5-point Likert-type scale (0 indicating no distress and 5 indicating extreme distress). The authors found that more traumas generated more distress, which related to more active coping. Posttraumatic growth was related to a higher number of traumas, more recent traumas, and a higher level of distress at the time of the trauma, as well as a subjective sense of wellbeing (e.g., feeling satisfied with one's life and in control of one's emotions). Similar to findings from other studies, certain domains related to a greater number of traumas, whereas others did not – Relating to Others, Personal Strength, and New Possibilities related to a greater number of traumas, whereas Appreciation of Life and Spiritual Change did not.

Curvilinear associations between peritraumatic distress and posttraumatic growth have also been found in participants with posttraumatic stress disorder symptoms. Kunst (2010) found positive linear and curvilinear associations between peritraumatic distress and posttraumatic growth. He examined peritraumatic distress (using the Peritraumatic Distress Inventory), posttraumatic stress disorder symptoms, and posttraumatic growth in a sample of Dutch victims of violence such as physical and sexual assault. His findings correspond with Kleim and Ehlers' (2009) study that found that higher reported peritraumatic fear and shame assessed 2 weeks after an assault predicted greater posttraumatic growth 6 months later. However, McCaslin et al. (2009) had not found an association between peritraumatic distress and posttraumatic growth overall, with the exception of the peritraumatic dissociation subscale of the Peritraumatic Distress Inventory. This may be because of the nature of the sample examined: McCaslin et al.'s (2009) study examined distress at the time of a range of traumas, whereas Kunst (2010) examined a more homogeneous sample of victims of violence. Additionally, the Peritraumatic Distress Inventory was found to have a relatively

low internal consistency score in McCaslin's sample, of only  $r = .65$ , which may have compromised the results of the study.

#### *1.7.2.3 Negative affect*

Longitudinal studies have measured negative affect in terms of tension, depression, anxiety, anger, fatigue, and confusion. Findings show mixed associations between posttraumatic growth and negative affect, which seems to fluctuate according to when posttraumatic growth and affect are measured. For example, Tomich and Helgeson (2004) found that, during chemotherapy, patients who reported finding benefits in their experiences showed more negative affect 3 months and 9 months later. Thornton and Perez (2006) found that, in patients who were undergoing surgery for prostate cancer, negative affect prior to the surgery predicted higher levels of posttraumatic growth 1 year on. However, at follow-up 1 year later, posttraumatic growth was unrelated to negative affect. Conversely, Carver and Antoni (2004) examined benefit finding and wellbeing in women with breast cancer during the year after surgery, and then 4–7 years after surgery. Controlling for levels of distress, early benefit finding predicted less depression, anxiety, and anger at follow-up. Finally, a study that examined reports of distress (tension, depression, anger, fatigue, and confusion) prior to a bone marrow transplant in cancer patients, and recollection of that distress, showed that patients who recalled themselves as being more distressed prior to surgery than they had reported at the time showed higher posttraumatic growth and decreased distress approximately 2 years after surgery (Widows, Jacobsen, Booth-Jones, & Fields, 2005).

Taken together, these findings suggest that posttraumatic growth may relate differently to negative affect depending on when and how it is measured. Maercker and Zoellner (2004) proposed, with their two-component model, that posttraumatic growth is related to a type of avoidance soon after or during a stressful event, part of an illusion that could balance the pain of a trauma. Subsequently, this may evolve into a more considered, integrated, comprehensive sense of growth that includes acknowledging the distress and the positive outcomes from the experience. This theory could explain the difference in findings on the association of posttraumatic growth and negative affect when measured at different times after a trauma. Additionally, it is possible that one constructs a personal story of posttraumatic growth some time after a trauma by inflating recalled distress from the time of

a trauma, and that this inflation of recalled distress aids an individual to perceive current distress as relatively relieved.

A weakness of many of these studies is assessment of negative affect as a combination of depression, anxiety, and other factors, such as fatigue, which likely masks different associations between posttraumatic growth and depression, and between posttraumatic growth and anxiety. Recall that Helgeson et al.'s (2006) meta-analysis of benefit finding and growth found that posttraumatic growth related to reduced depression but was not related to anxiety. Further research elaborating on these findings is outlined in the following section describing a possible buffering role of posttraumatic growth on ongoing low mood.

#### *1.7.2.4 Posttraumatic growth as a possible buffer that eases negative affect*

A buffering role of posttraumatic growth on negative affect has been suggested by some research: posttraumatic growth appears to ease concurrent negative affect engendered by very stressful experiences. In Lechner et al.'s (2006) study with women at different stages of breast cancer, a curvilinear association was found between benefit finding and measures of distress. Women with high and low levels of growth reported better quality of life, more positive affect, less depression, less negative affect, and less social disruption from their cancer than those with medium levels of growth. Those reporting high levels of growth were more likely to have had chemotherapy than those with medium or low levels of growth, and the group with higher levels of growth also had a higher proportion of Stage II cancer than did the groups of women with medium levels of growth (which had a higher proportion of Stage I cancer) or low levels of growth (which had a higher proportion of Stage 0 cancer). Thus, it is possible that growth buffered the stressful experience of a more threatening illness, resulting in reduced negative emotion and more positive affect. Similar findings with women living with HIV/AIDS support this theory; for women experiencing more physical effects from their illness, posttraumatic growth was found to relate to reduced anxiety and depression and increased positive affect (Siegel & Schrimshaw, 2007).

Silva, Moreira, and Canavarro (2012) also found evidence for posttraumatic growth working to ease concurrent distress. In a cross-sectional study of women with breast cancer, posttraumatic growth co-existed with distress (anxiety and depression); with dysfunction, reflected in lower physical quality of life (comprising levels of energy, pain, sleep, mobility,



work capacity, dependence on medication or medical aids, and competence in activities of daily living); and with lower psychological quality of life (comprising negative feelings, self-esteem, positive affect, body image, spirituality, thinking, memory, and concentration). They found that posttraumatic growth buffered the negative effects of distress, such that women who felt breast cancer had a greater negative impact on their lives and who had higher levels of posttraumatic growth reported less depression and greater psychological quality of life.

Further support for the theory that posttraumatic growth may buffer negative affect comes from research with a group of women who had experienced sexual assault. Posttraumatic growth and distress (posttraumatic stress disorder symptoms and depression) were measured at four time-points (2 weeks, 2 months, 6 months, and 1 year after the assault). Over time, more women reported growth, and distress decreased. One year after the assault, no association was found between positive changes and posttraumatic stress disorder, but there was an association between positive changes and decreased depression. Changes in worldview were commonly negative and endured through the study, with women viewing the world as less fair and less safe than before, and people as less good than before. Increases in empathy and in relationships were commonly reported early on and throughout the study, whereas increases in personal strength were more likely to be reported at later stages. Overall, positive changes post-assault increased over time and negative changes decreased. Two weeks post assault, positive changes identified were associated with lower levels of distress, whereas negative changes were related to increased distress relating to self-image and spirituality. One year after the assault, those who reported the least depression were the group of women who identified the most positive changes 2 weeks after the trauma, and who maintained these positive changes over time (Frazier et al., 2001). As such, both distress and posttraumatic growth resulted from some women's experiences of assault; those who maintained the perception of growth reported more positive mood. It appears that posttraumatic growth may act to ease negative affect but have a co-existing association with posttraumatic stress disorder symptoms.

Other studies lend support to the theory that growth aids individuals to manage distress. Ickovics et al. (2006) found that higher posttraumatic growth predicted lower distress (depression, anxiety, and hostility) at three time-points before and after a trauma. They examined posttraumatic growth and distress in teenage girls before and after a range of

stressful events (death of a loved one, pregnancy and motherhood, physical threat, and interpersonal problems). Three time-points over the course of 18 months were used to measure baseline emotional distress before any traumatic events occurred, and distress and posttraumatic growth after a trauma had occurred. Those who had experienced a traumatic event during that time completed measures of posttraumatic growth at 12 and 18 months after baseline, and multi-level modelling was used to predict the trajectory of posttraumatic growth across all time-points. Overall, distress declined over time. Those girls with higher pre-trauma posttraumatic growth showed lower pre-trauma distress, which declined over time. Those with lower pre-trauma posttraumatic growth showed higher levels of distress before the traumatic event, which remained high after the trauma and had declined at 18 months after baseline. Thus, higher posttraumatic growth was associated with lower depression, anxiety, and hostility at the three time-points.

Further, Schwarzer, Luszczynska, Boehmer, Taubert, and Knoll (2006) noted two patterns in a group of patients who underwent surgery for cancer. One group had high levels of benefit finding before surgery, 1 month after surgery, and 1 year after surgery. Another group had initially low levels of benefit finding before surgery, which increased over the next year. This increased benefit finding was associated with markers of correspondingly increasing wellbeing over time (less depression, fewer health worries, and higher health-related quality of life). Finally, a recent study (Siqueland, Nygaard, Hussain, Tedeschi, & Heir, 2015) assessed tsunami survivors at two time-points (2.5 years and 6 years after the 2004 Southeast Asia Tsunami). Posttraumatic stress, depression, quality of life, and posttraumatic growth were found to have a complex relationship. Specifically, where posttraumatic growth levels were higher 6 years after the tsunami, higher quality of life was associated with less depression; where posttraumatic growth levels were lower 6 years after the tsunami, higher levels of posttraumatic stress were related to lower quality of life. Global quality of life in this study was measured using just one item, 'How would you rate your quality of life?'. Health-related quality of life was measured with 'How satisfied are you with your health?'. The authors stated that these single items were usually moderately to highly correlated with the full-scale scores from the World Health Organisation Quality of Life – Brief Scale (The WHOQOL Group, 1998). However, the study was conducted with a relatively small sample of 58 Norwegian respondents, and such results therefore need to be replicated to further

examine the interactions between posttraumatic growth, posttraumatic stress, depression, and quality of life.

In summary, current research suggests that posttraumatic growth can function to ease concurrent depression through mechanisms that are not yet well understood. The association between anxiety and posttraumatic growth is unclear: anxiety has not consistently been found to relate to posttraumatic growth and has often been measured as a component of distress (amalgamated with depression and hostility, to represent negative affect), which does not allow for specific associations between anxiety and posttraumatic growth to be examined.

#### *1.7.2.5 Association of perceived threat and higher objective severity of threat with posttraumatic growth*

In their meta-analysis of cross-sectional studies following a range of trauma, Helgeson et al. (2006) reported that benefit finding (and posttraumatic growth) were consistently associated with objective stressfulness of an event (physician rating or disease stage), perceived stress associated with an event, lower levels of depression, and intrusive or avoidant thoughts about the stressful event. However, posttraumatic growth was unrelated to anxiety and global distress (negative affect and general mood). In a similar vein, reviews indicate that higher levels of perceived harm and threat relate to higher levels of growth (Linley & Joseph, 2004). Severity of threat (both objective and subjective) has been found to relate to higher levels of expressed posttraumatic growth (Cordova et al., 2001; Zoellner, Rabe, Karl, & Maercker, 2008).

A review of 29 studies on posttraumatic growth in cancer patients and survivors by Stanton, Bower, and Low (2006) showed that posttraumatic growth was consistently related to perceived stressfulness of having cancer, *but not always* to the stage of breast cancer. Associations with psychological distress were mixed, and distress was measured in a variety of ways, including negative affect, positive affect, psychological wellbeing, quality of life, and adjustment to illness. Of the 15 studies that examined posttraumatic growth and distress, nine showed no association between them, four found that lower distress was related to higher posttraumatic growth, and one found that higher distress was related to higher posttraumatic growth. Mixed findings may be a result of the amalgamation of measures of ‘distress’ and ‘adjustment’, which display different associations with posttraumatic growth.

Again, it may be that particular traumatic events have features that trigger the posttraumatic growth process and contribute to posttraumatic growth in different ways. What is consistent across studies is that a higher perceived stressfulness of experiences engenders higher levels of posttraumatic growth. It seems likely that the perception and experience of stress may engage an individual in a process that can lead to growth.

Considering the two-component model of posttraumatic growth (Maercker & Zoellner, 2004), which considers posttraumatic growth to have an illusory and a veridical side, threat severity is thought to relate to posttraumatic growth no matter whether posttraumatic growth is illusory or real. Zoellner et al. (2008) explored how objective severity and subjective severity relate to different domains of posttraumatic growth, and found that objective severity was related to higher scores on the Posttraumatic Growth Inventory subscales of New Possibilities and Personal Strength, whereas subjective severity related to New Possibilities, Relating to Others, and Spiritual Change (Zoellner et al., 2008). Thus, it appears that the struggle can lead to growth in varying forms.

#### *1.7.2.6 Number of prior stressors one successfully copes with may not predict posttraumatic growth*

Few studies have examined the effects of prior life stressors on current levels of posttraumatic growth in response to a new trauma. One study with adolescents found that prior life stressors did not encourage growth; posttraumatic growth related to fewer previous stressful life events, as well as less stress in general, and a worldview that is ‘future-oriented’ (Arpawong et al., 2016).

At first glance, it may seem that such findings are incompatible with the Stress Inoculation Theory (Meichenbaum & Deffenbacher, 1988). However, on examination, the theory fits with the few findings available that indicate prior life stressors do not encourage current posttraumatic growth. The Stress Inoculation Theory proposes that moderately stressful events can build up the capacity to deal with future events. The model includes developing coping skills to use in dealing with stressors. As such, where individuals experience successful coping and build a sense of self-efficacy, stress inoculation may be effective. It may be that, when stressors occur and those affected feel ill-prepared and judge themselves as ineffective, exposure to trauma induces more deleterious effects. Such a theory is

supported by findings that existing personal resources (such as a sense of competence and flexibility, and an ability to self-soothe and self-reflect) as well as successful coping experiences with prior traumas are reported by some women and children exposed to stressors who exhibited resilience (Plaskett, 2000; Samuels, 2002).

Taking these findings together, The Stress Inoculation Theory is likely to reflect increased coping skills and resilience after successful coping with prior trauma. This increased resilience from past traumas does not equate to increased posttraumatic growth in response to current traumas, as in theory an individual would be less likely to be shaken by a current trauma, and have less distress to cognitively and emotionally process. This would lead to less posttraumatic growth.

### ***1.7.3 Contribution of trauma type to posttraumatic growth***

Helgeson et al. (2006) examined in their meta-analysis whether the nature of life stressors influenced benefit finding. They reported that in cases of trauma related to personal health, growth was associated with less 'global distress' (measured using a variety of scales examining negative and positive affect), whereas in cases of personal trauma growth was unrelated to 'global distress'. However, their findings are not conclusive because of the broad range of traumas categorised as 'personal trauma' and the small number of studies able to be analysed. Additionally, a variety of measures of distress may mask effects of particular associations between particular distress measures and posttraumatic growth.

Few studies have compared posttraumatic growth according to trauma, as it is not ethical to engineer traumatic situations of different kinds in order to compare posttraumatic growth according to trauma type. Shakespeare-Finch and Armstrong (2010) compared rates of posttraumatic stress disorder and posttraumatic growth depending on whether the traumatic experiences were of a vehicle accident, sexual abuse, or bereavement. They found that bereavement related to higher posttraumatic growth than other traumas, whereas victims of sexual abuse showed higher rates of posttraumatic stress disorder than other traumas while still exhibiting moderate posttraumatic growth. McMillen et al. (1997) compared rates of perceiving benefits after three different events: tornado, mass shooting, and plane crash. Rates of benefit finding were significantly different depending on the event, with the tornado producing the highest percentage of survivors reporting benefits, followed by the shooting

and then the plane crash. The authors noted that rates of benefit finding related to the size of the community in which the event took place: smaller communities showed more benefit finding. Perhaps this was because smaller towns rallied help victims more quickly, or that such a traumatic event was more of a defining event for a smaller town and so the community regarded the event as having affected everyone, not simply the victims. Second, it may be that some traumas are more likely to elicit community support; others in the community may be more likely to support victims of a natural disaster than of a criminal action or a mechanical fault. Such hypotheses are yet to be tested.

Survivors of some types of trauma have expressed additional elements of posttraumatic growth not reported by survivors of other traumas. For example, qualitative research with cancer survivors found that not only were the domains of posttraumatic growth assessed by the Posttraumatic Growth Inventory endorsed, but survivors also reported an increased compassion for others struggling with similar difficulties, and more engagement in health-related activities, such as increasing exercise and improving diet (Morris, Shakespeare-Finch, & Scott, 2012). Equally, Hefferon et al. (2009) reported that survivors of life-threatening illnesses reported themes such as ‘trauma equals development of the self’ and ‘new awareness of the body’, which would not be captured using traditional measures of posttraumatic growth, such as the Posttraumatic Growth Inventory. Thus, traumas likely involved qualitatively different experiences of distress and posed different challenges to one’s view of the world, self, and others. Such differences in the expression of posttraumatic growth according to trauma type are not accounted for explicitly by existing models of posttraumatic growth. However, implicitly this is consistent with posttraumatic growth theories that trauma will pose particular challenges to aspects of one’s worldview. Individuals have an inner drive to rebuild their worldviews to incorporate the trauma, and therefore the views that are modified will be the particular views challenged by a trauma. If a traumatic illness is experienced, one might be forced to recognise that one’s health is fragile and that it is important to nurture one’s body; this would be different from an earthquake experience that challenged worldviews of the earth being stable.

In regards to positive changes reported after the Canterbury earthquake sequence, qualitative research with general practitioners found that they described workloads decreasing or increasing influenced by individuals moving within the city or leaving the city. Greater

numbers of patients visited GPs with issues related to stress and anxiety, and a variety of psychological impacts were described as presenting at different times. An appreciation of additional supports such as counselling services provided to patients was described, and an initial burgeoning community spirit was reported, with some GPs describing this declining over time (Johal, Mounsey, Tuohy, & Johnston, 2014). Fergusson, Boden, Horwood, and Mulder (2014) found in their interviews with a representative sample of Cantabrians that they reported some positive outcomes from the Canterbury earthquake sequence, such as improved relationships, increased maturity of one's children, and a greater appreciation of life. Negative experiences were also reported, such as distress during the earthquakes, damage to homes, earthquake-related disruptions, and injury to self or others. Qualitative interviews with nurses after the Canterbury earthquakes (Johal, Mounsey, Brannelly, & Johnston, 2016) indicated that nurses faced short-term challenges, such as losing access to essential services, damage to housing, and more stressful work environments. Long-term earthquake-related challenges were also described, such as difficulties with the EQC and temporary housing solutions, lower energy, and compassion fatigue. Nurses reported both positive emotional responses, such as pride, gratitude, and relief, and concurrent negative emotional responses, such as fear, guilt, and frustration, illustrating positive and negative responses co-existing. Outcomes akin to posttraumatic growth were described, such as judging the self as stronger. A second study further explored the positive repercussions, changed worldviews, and re-examination of values reported by nurses after the Canterbury earthquake sequence (Johal & Mounsey, 2015). Nurses reported feeling more confident, feeling stronger in themselves, being proactive, and being more accepting of asking for help and showing emotions. Additionally, nurses described placing an increased value on relationship quality; increased stress was placed on relationships and some reported closer relationships with family and colleagues. Reported changes in perspectives included sensing a lack of control, viewing the world as less benign than before, and reassessing values. Further, a theme was noted of re-evaluating the demands and supports inherent in one's changing role, and choosing to modify roles where more self-care was needed. Last, the value of earthquake-related experiences was described, along with a sense of pride and privilege, a sense of luck in one's circumstances compared to what could have happened, and gratitude. Such themes may be present in the current sample; it is of interest whether a sample selected for resilience will describe similar themes after earthquake-related stressors.

#### **1.7.4 Time since trauma**

Theories of posttraumatic growth suggest that the development of posttraumatic growth is a process that takes time after a trauma. Different individuals will take different lengths of time to comprehend a trauma, and then to go on to find positive significance of the trauma for their life. Joseph and Linley's (2005) organismic valuing theory of growth after adversity suggests that the time posttraumatic growth takes to emerge is a function of how disruptive a trauma is to an individual's previous worldviews, and to the resources an individual can access to meet goals of competence, autonomy, and relatedness in order to gain personal fulfilment. As such, it is not possible to suggest timeframes in which individuals might exhibit posttraumatic growth.

Some research supports the theory that posttraumatic growth develops across time. Danhauer, Case, et al. (2013) noted that, over time, posttraumatic growth increased and was associated with greater reported spirituality, greater social support, and use of active coping strategies. Likewise, Manne et al. (2004) found that, in the 18 months after diagnosis with breast cancer, both patients and their partners reported increasing levels of posttraumatic growth, measured at three time-points. Because of the assumed evolving nature of growth, some authors suggest that posttraumatic growth should be measured at least 2 years post-trauma (Helgeson et al., 2006).

Others report that posttraumatic growth may decrease over time; for example, in a cross-sectional study, posttraumatic growth was lower in survivors of breast cancer 5.5 years after diagnosis than in other survivors closer to 1 year after diagnosis (T. Weiss, 2004), particularly in the subscales of Appreciation of Life and Relating to Others. It may be that some of the gains perceived during and after a stressful event wane after diagnosis; an individual may need less social support and be reminded less often of the fragility of life; therefore, the perception of posttraumatic growth after a trauma may decline in response. In a longitudinal study with Israeli war veterans, posttraumatic growth measured at two time-points was also found to decline over 5 years (Dekel et al., 2012). Taking into consideration findings from other studies, the authors propose that within a relatively stable trajectory of growth across time, there may be fluctuations similar to that of the trajectory of posttraumatic stress disorder over time (Port, Engdahl, & Frazier, 2001), where posttraumatic stress



disorder symptoms have been found to re-emerge or increase over time in some older war veterans.

Many longitudinal studies have found that positive changes are seen soon after a trauma and are stable across time (Llewellyn et al., 2013; Marshall et al., 2015; Silva, Crespo, & Canavarro, 2012). For example, after the Christchurch earthquake sequence in 2010 and 2011, Marshall et al. (2015) asked residents affected by the earthquakes about improvement or decline in personal strength and relationships with others over time. They measured improvement and decline at three time-points (1 month after the first September 2010 earthquake, and 3 months and 12 months after the more devastating earthquake in February 2011). Although most respondents reported no growth or decline in perceptions of personal strength, most of the sample reported improvements in their relationships with others, to different degrees. Levels of improvement or decline identified 1 month after the first earthquake remained stable over time.

One possibility discussed already is that posttraumatic growth may change in nature and function over time. Studies of the association of posttraumatic growth with other variables have found that time elapsed since trauma moderates the association between global distress and posttraumatic growth, such that posttraumatic growth is related to more distress only when the trauma is recent. Anxiety is an exception here; it appears that reduced anxiety in the short-term is associated with posttraumatic growth. Additionally, longer time since trauma predicts lower levels of depression and higher positive affect (Helgeson et al., 2006). Such findings could indicate that posttraumatic growth serves different functions according to the stage of processing after a trauma. This fits with the Janus-face model proposed by Maercker and Zoellner (2004) that posttraumatic growth has two facets: the first more illusory to help sooth inevitable distress from a trauma, and the second more veridical growth from reflection on the meaning of the event, the meaning of one's life, and the things that one should prioritise.

Pertinent to this possibility are Butler et al.'s (2005) findings that about 9 weeks after the 9/11 terrorist attacks in the USA, posttraumatic growth was associated with more posttraumatic stress disorder symptoms, more engagement with life goals, positive changes to assumptive worldviews, and more denial. Although posttraumatic growth was generally found to have declined at about 6 months after the attacks, those who showed higher levels of

posttraumatic growth 6 months after the attacks also reported decreases in posttraumatic stress disorder symptoms, more positive worldviews, and using acceptance and positive reframing to cope. Thus, sustained growth may be associated with certain methods of coping and different correlates at different stages post-trauma.

### **1.7.5 Personality factors**

#### *1.7.5.1 Optimism, openness, agreeableness, conscientiousness, and extraversion*

Certain personality factors have generally been found to be associated with posttraumatic growth. These include optimism, openness to experience, conscientiousness, and agreeableness, whereas neuroticism has a negative association with posttraumatic growth generally (Linley & Joseph, 2004). Personality factors could fit into the ‘individual differences’ pre-trauma in Calhoun et al.’s (2010) comprehensive model of posttraumatic growth. In Joseph and Linley’s (2005) organismic valuing theory of growth through adversity, it might be that such personality factors are influenced by whether needs of autonomy, relatedness, and competence have been met prior to a trauma. If one has been able to successfully meet these needs, it is likely that one is more familiar with listening to instinct on how to go about meeting these needs and gaining fulfilment. It is likely that these experiences forge a sense of optimism about future events, and a willingness to approach others and collaborate with others in order to meet personal and mutual goals.

Studies have found extraversion to predict posttraumatic growth (Tedeschi & Calhoun, 1996; Tennen & Affleck, 1998). In the case of teenage survivors of the 2008 Wenchuan earthquakes, extraversion was directly related to posttraumatic growth and was also found to relate indirectly through social support. It is possible that extraverts are more likely to seek social support and that this social contact helps them process their experiences and perhaps also to meet their basic needs (Jia, Ying, Zhou, Wu, & Lin, 2015). In a sample of 110 British and North American patients with a history of heart disease, extraversion was found to positively correlate with posttraumatic growth, mediated by problem-focused coping (cognitive problem solving and acting to solve a problem) but not by satisfaction with social support. Similarly, the personality variables of extraversion and openness to experience in a group of 526 North American ambulance officers were most strongly positively correlated with posttraumatic growth, and these personality variables were moderated by what the

authors termed ‘adaptive coping’, which was a measure of a combination of coping strategies (searching for meaning, using individual and interpersonal action to gain mastery, and philosophical self-examination). A more specific examination of the way coping strategies relate to personality variables and posttraumatic growth would be useful to help gain understanding of how personality variables might contribute to the posttraumatic growth process.

Helgeson et al. (2006) also found in their meta-analysis of cross-sectional studies that optimism was consistently associated with benefit finding and posttraumatic growth, with moderate effect sizes. It is not surprising that optimism is associated with posttraumatic growth, given that optimists are by definition more likely to expect good things rather than bad things for themselves. Optimists may be more likely to perceive benefits in a difficult situation (Affleck & Tennen, 1996).

As such, cross-sectional research generally shows a consistent association between optimism and posttraumatic growth, but longitudinal studies show that this association is not always supported over time; in Milam’s (2004) study with HIV/AIDS patients, optimism was associated with posttraumatic growth at recruitment, but not 1.6 years later. Prati and Pietrantonio (2009) conducted a meta-analysis to tease out associations between posttraumatic growth, optimism, social support, and coping strategies. They found that optimism was moderately associated with posttraumatic growth, but not as strongly as the coping strategies of positive reappraisal and religious coping. They also note that not all studies found an association between optimism and posttraumatic growth, suggesting that posttraumatic growth and optimism are distinct, rather than overlapping constructs. It is therefore possible that optimism encourages posttraumatic growth through its association with coping styles such as active coping, positive reappraisal, and seeking social support (Zoellner & Maercker, 2006).

Zoellner, Rabe, Karl, and Maercker (2011) explored the association of optimism, openness to new ideas, and posttraumatic growth in the context of the two-component Janus-face model of posttraumatic growth. The authors chose optimism to measure the illusory, and openness to new ideas to measure the more veridical sides of posttraumatic growth that would reflect real change in an individual. They studied survivors of motor-vehicle accidents and found that greater optimism was associated with higher posttraumatic growth in individuals who

met more criteria for posttraumatic stress disorder, and lower posttraumatic growth in those with lower severity of posttraumatic stress disorder. Conversely, in accident survivors with low posttraumatic stress disorder severity, Armeli et al. (2001) found that more openness to new ideas related to higher posttraumatic growth; openness to new ideas was not associated with posttraumatic growth in survivors with higher posttraumatic stress disorder severity. Posttraumatic growth was also associated with some adaptive coping strategies such as positive reinterpretation, and some less adaptive strategies such as disengagement (Armeli et al., 2001). These researchers concluded that their findings support posttraumatic growth as a multidimensional construct. Optimism may relate to the illusory side of posttraumatic growth in cases of more severe posttraumatic stress disorder and provide some counterbalance to distress, whereas there may be less need for optimism in cases of less severe posttraumatic stress disorder, where posttraumatic growth relates to more openness to new ideas. The illusory and veridical sides of posttraumatic growth may thus be supported differently.

#### *1.7.5.2 Spirituality or religiosity*

Religiosity or spirituality are influences in the social, cultural, and ruminative component of posttraumatic growth, as outlined by Calhoun et al.'s (2010) comprehensive model of posttraumatic growth. In their writings on individuals' perspectives on religion and spirituality, Hill et al. (2000) note that currently religion and spirituality are not seen as mutually exclusive constructs. They define spirituality as 'the feelings, thoughts, experiences and behaviours that arise from a search for the sacred'. Religion is conceptualised as incorporating spirituality but also including a possible search for non-spiritual goals, such as identity, belongingness, or meaning, in a context that supports the search for the sacred. Additionally, in the case of religion the means of the search (rituals and behaviours) are condoned by a recognised group of people.

Religiosity has widely been found to relate to higher posttraumatic growth (Danhauer, Case, et al., 2013). The meta-analysis of benefit finding and growth conducted by Helgeson et al. (2006) showed that greater religiosity was associated with benefit finding and posttraumatic growth consistently, perhaps in part because a domain of posttraumatic growth is Spiritual Change, and greater religiosity may prime individuals for this type of growth. Also pertinent, religiosity has been found to relate to higher levels of gratitude, even in the face of negative

affect and stress (Rosmarin, Pirutinsky, Greer, & Korbman, 2016); it is likely that benefit finding is related to measures of gratitude, and gratitude may contribute to the posttraumatic growth process.

Spirituality and religion can provide a framework for understanding the world and thus play a role in the way stressors are perceived, addressed, and resolved. Many turn to religion in times of stress, as seen after the 9/11 attacks in a random sample of North American citizens, where 90% reported turning to religion (Schuster et al., 2001). However, trauma does not automatically lead to strengthened faith, as seen with war veterans who reported weakened faith after involvement in killing others (Fontana & Rosenheck, 2004). Although religion can aid denial of the painful reality of circumstances, it can function in many other ways and according to some reviews is more likely to provide an opportunity for reinterpreting the meaning of an event, rather than denying its difficulty (Pargament & Park, 1995; Wnuk & Marcinkowski, 2014). Religious involvement may provide supports for growth in varied ways, such as opportunities for connecting with others, personal growth, opportunity to find meaning in events, and a connection with the sacred. Religiosity can encourage more active engagement with an event to find meaning, and this can be associated with decreased distress (Pargament, Desai, & McConnell, 2006; Pargament & Park, 1995).

Spirituality can either aid or hinder growth, depending on its role in an individual's life. If spirituality provides a sense of support, helps find meaning in suffering, or influences priorities and goals after trauma, it can be a source useful for coping. Spiritual struggles can also occur in the face of crises, such that some report their faith as weakened. These can occur when an individual experiences conflict with others in their religious community. Struggles can also take place within an individual over doubts with practices or beliefs. Additionally, views of the divine can be challenged; if prior to the trauma a view is held of a deity who guarantees good things without exception, when painful experiences occur an individual may undergo a process of re-examining their beliefs and their perceptions of God (Ellison, Roalson, Guillory, Flannelly, & Marcum, 2010).

Research examining spirituality and religious views have found that the more flexible a spiritual view or attitude, the better adjusted is the individual. Similarly, where complexity is tolerated and simplicity avoided, and individuals are able to process and incorporate new and disparate information into their belief systems, they are also less likely to attempt to apply

inappropriate solutions to their problems (Weinborn, 2000). Such flexible spiritual and religious views relate to increased growth, as well as more rumination soon after a trauma (Calhoun, Cann, Tedeschi, & McMillan, 2000); this would make sense if individuals are working to process the trauma and incorporate it into their worldview, searching for meaning.

Chan and Rhodes (2013) examined ‘positive religious’ coping separately from ‘negative religious coping’ for victims of Hurricane Katrina. Positive religious coping refers to searching for and sensing support from God, positive reappraisals of God’s will in a situation (‘God may be teaching me something from this’), and religious absolution (asking God for forgiveness for anger). Negative religious coping refers to ascribing responsibility for stressors to the devil, negative reappraisals of God’s will in a situation (‘God is punishing me’), and a sense of spiritual discontent (‘God has left me’). These negative appraisals are associated with depression, whereas positive religious coping strategies are associated with higher posttraumatic growth. Additionally, Ai, Park, Huang, Rodgers, and Tice (2007) found that, amongst cardiac patients, religiosity predicted positive religious coping, which was associated with posttraumatic growth. The association between positive religious coping and posttraumatic growth was fully mediated by social support and hope. Greater negative religious coping led to lower hope, lower levels of social support, and thus lower posttraumatic growth. Such findings suggest that religiosity can be associated with a range of coping strategies that relate to posttraumatic growth: positive reappraisal in the context of spirituality, a context for finding meaning, active coping strategies, and greater sense of social support. This is bolstered by research showing that religiosity is related to increased positive affect, hope, and finding meaning in life (Wnuk & Marcinkowski, 2014). Whether religiosity or spirituality is a support for an individual appears to depend on whether it leads to positive or negative religious coping.

Various studies suggest that religious conviction and belief in supernatural agents strengthen in the face of mortality (Norenzayan & Hansen, 2006) and trying circumstances, and that religion becomes more attractive in the wake of a trauma as a source of consolation (Gray & Wegner, 2010). In the context of those affected by the Christchurch earthquakes, Sibley and Bulbulia (2012) were able to examine change in identifying with a religious or spiritual group, in comparison to New Zealand-wide figures. They used responses from a longitudinal, nationwide study (New Zealand Attitudes and Values study running from 2009 to 2029 by

Associate Professor Chris Sibley at the University of Auckland) to examine how many earthquake-affected individuals changed whether they identified with a religious or spiritual group. Their findings show that, although the New Zealand-wide trend was for citizens to no longer identify as religious (a decrease of 0.9% per year), in the case of earthquake-affected Cantabrians, rates of identification with a faith increased by 3.4%. Although 3.4% reflected a net increase, there were also those who lost their faith at the time of the earthquakes. For mental health outcomes, converting to faith or keeping a faith did not appear to buffer the effects of stress; however, those Cantabrians who reported no longer identifying with a spiritual or religious group reported significantly lower satisfaction with their health. Thus, it appears that keeping a spiritual or religious belief at times of stress may buffer the effects of this stress, whereas conversion does not offer such a buffer. As such, in the context of posttraumatic growth, spiritual change may be encouraged by the experience of trauma and the struggle to make sense of it. However, if loss of spiritual belief occurs, individuals may also suffer in their subjective assessment of their health.

Finally, different facets of spirituality may be influenced by struggles and hardships. Denney et al. (2011) used qualitative research to explore posttraumatic spiritual growth with cancer survivors and found that growth was experienced in the following areas: spiritual commitment, general spirituality, spiritual support, spiritual experiences, private practices, spiritual participation, and spirituality as a motivating force. Growth was not expressed as change in spiritual beliefs or values. In light of posttraumatic growth models proposing that assumptive worldviews are shaken and must be rebuilt, it may be that where spiritual worldviews are flexible and unshaken there is more room for growth in other aspects of spiritual life.

Recently, the need to expand the spiritual–religious domain of growth to include secular philosophy has been noted (Wernimont, 2013), given the rising numbers of non-religious individuals. Wernimont suggests that expanding concepts of spirituality to include existential–cognitive concepts of change and meaning making can encompass individuals who identify as spiritual, philosophical, or religious, as well as those who do not.

In summary, flexible religious and spiritual stances can provide a framework that can be adjusted to accommodate traumatic experiences and gain a new understanding of the world. Religiosity has also been noted to relate to gratitude, and likely provides access to an

increased network for social support. These factors are likely to support the process of posttraumatic growth and contribute to the widely noted association between religiosity and posttraumatic growth. Finally, as religion and spiritual belief evolve and more individuals identify as non-religious, it is important to disentangle the concept of existential thought from religion and spirituality when measuring posttraumatic growth. Existential thought is a component of making sense of one's traumatic experiences and a theorised part of the posttraumatic growth process, but it is not currently measured outside of religiosity in tools such as the Posttraumatic Growth Inventory.

### ***1.7.6 Cognitive and behavioural responses to trauma***

In the face of trauma, it stands to reason that ways of responding to hardship influence the meaning individuals make from their struggle and may impact on the response to trauma. Znoj (2006) emphasises that certain factors must exist in order for an individual to experience growth: to be open-minded, to be able to secure support from others, and to be hopeful and forgiving. Research shows that particular strategies encourage posttraumatic growth or recovery, with some seemingly more 'adaptive' than others (Armeli et al., 2001; Butler et al., 2005; Helgeson et al., 2006). Models of posttraumatic growth posit that rumination is part of the process of making sense of a trauma after the event in order to reconstruct a shattered assumptive world. Rumination in this context describes conscious cognitive processing of the trauma, reflecting and working to make sense of the trauma in one's life and in relation to one's worldviews and goals (Calhoun & Tedeschi, 2006; Janoff-Bulman, 2004).

#### ***1.7.6.1 Rumination and reflection: Intentional engagement with trauma***

In much of psychology, the term 'rumination' has been used to reflect solely negative thinking (e.g., Nolen-Hoeksema & Morrow, 1993). However, harking back to the original meaning of rumination lends more of a neutral definition: rumination as repetitive thinking. Rumination can be deliberate and reflective, or more intrusive and unwanted. Deliberate, reflective rumination is related to posttraumatic growth; it may involve a search for meaning and positive benefits and reminding oneself of gains experienced through one's struggle (Lindstrom, Cann, Calhoun, & Tedeschi, 2013). Styles of cognitive engagement with a trauma therefore influence the psychological outcome of this engagement.



Calhoun and Tedeschi (2006, in their study of bereaved parents, investigated types of rumination and found that different types of rumination were related to different aspects of posttraumatic growth. For example, intrusive thinking was not related to posttraumatic growth either early after the loss or later on. Repetitive non-intrusive thinking soon after the loss was related to posttraumatic growth, as were recalled attempts at finding meaning soon after the child's death. At later stages, positive reinterpretation and reminding oneself of benefits were related to posttraumatic growth. They also noted that different cognitive activities related to differing domains of posttraumatic growth: repetitive thoughts after the death related to increases in personal strength only, whereas searching for meaning related to all other domains of posttraumatic growth. In another study, individuals with leukaemia who engaged in deliberate rumination were more likely to exhibit posttraumatic growth 1 month and 2 months after baseline, but intrusive rumination did not correlate with posttraumatic growth (Danhauer, Russell, et al., 2013).

Rumination and voluntary repeated cognitive processing of events have been found to be associated with posttraumatic growth (Calhoun et al., 2000; Cann et al., 2011; Taku et al., 2008). However, rumination may not operate alone in supporting posttraumatic growth, but it may encourage disclosure to others, which in turn could facilitate cognitive processing, strengthen relationships, and provide validation and outside perspectives. Lindstrom et al. (2013) examined rumination interacting with challenges to core beliefs, disclosure to others, and posttraumatic growth. They examined a sample of university students having undergone a stressful event in the prior 2 years, and found that deliberate rumination soon after the stressful event was associated with less current stress about the trauma, in cases where individuals had disclosed positive consequences from their struggles. The strongest predictor of posttraumatic growth was a higher level of challenges to core beliefs, which supports the theoretical models of posttraumatic growth suggesting that assumptive worldviews must be challenged for growth to occur. Higher levels of deliberate rumination were associated with higher levels of disclosure to others about both positive and negative consequences from the trauma. Although levels of disclosure were not related to posttraumatic growth, this study did not measure the responses of others to disclosure, which have been found to encourage or discourage further disclosure, and may further strengthen relationships (Calhoun & Tedeschi, 2006).

It is interesting to consider how deliberate and intrusive rumination might work together over the course of processing a stressful event. Experiences of intrusive thoughts about an event are not unusual soon after the event if it is either traumatic, such as a death, or very pleasant, such as meeting an attractive potential partner. It is theorised that intrusive rumination may stimulate a more deliberate, deeper cognitive examination of an event and its meaning (Cann et al., 2011). In this way, intrusive and deliberate rumination may occur at different times in the aftermath of a trauma and may both contribute to reconstructing one's view of the world and oneself. Where capability and efficacy are realised, relationships are strengthened, or philosophical views are considered, this process can lead to posttraumatic growth.

#### *1.7.6.2 Taking action, problem solving, and cognitive strategies*

Theories of posttraumatic growth propose that growth is a function of personal resources, coping strategies, and appraisal of the stressful event (Armeli et al., 2001; Janoff-Bulman, 1992; Tedeschi & Calhoun, 1995). It appears that growth is associated with some kind of engagement with the difficult situation at hand, either cognitively (such as acknowledging and tackling the trauma) or practically (such as actively resolving difficulties or asking for help) (Cordova et al., 2001; Janoff-Bulman, 2004). For example, Wild and Paivio (2003) studied college students with a range of traumatic experiences and found posttraumatic growth associated with strategies that fall under the term 'active coping', including positive reframing, social support, humour, and religious support. Participants in this study also reported using 'emotional coping' strategies: avoidance and emotional venting. However, these were not associated with posttraumatic growth. Similarly, Butler et al. (2005) found that, in the wake of the 9/11 terrorist attacks, posttraumatic growth was associated with coping strategies of more denial and persistent engagement with goals, rather than disengaging from goals affected by the attacks.

Armeli et al. (2001) examined a wide range of coping based on an inventory of coping styles named the COPE (not an acronym), in order to examine possible interactions between coping, resources, stressor appraisal, and stress-related growth in adult and student samples. They examined problem-focused coping (planning, problem solving, seeking social support); emotion-focused coping (using humour, seeking emotional support, active coping, religious coping, and positive reframing); and maladaptive coping (behavioural disengagement, avoidance, denial, drug use). They found that higher levels of growth were reported by a

group who were exposed to more stressful events, who deemed they had more support available to call upon, and who used active, problem-focused strategies (problem- and emotion-focused).

Specific cognitive coping strategies, such as acceptance, have been found to aid posttraumatic growth, whereas emotional venting and avoiding situations that trigger negative emotions have been found to be associated with low posttraumatic growth (Kashdan & Kane, 2011; Znoj, 2006). Positive reframing of events has widely been found to be associated with posttraumatic growth (Helgeson et al., 2006; Linley & Joseph, 2004), as have acceptance and denial. These strategies are known as ‘emotion-focused coping strategies’, which centre on coping with the emotion associated with an event by trying to make sense of the event or find meaning in it cognitively (Vishnevsky, Cann, Calhoun, Tedeschi, & Demakis, 2010). Finally, humour is often found to correlate with optimism (Carver et al., 1993) and has been noted to predict posttraumatic growth and reduced distress (Scrignaro, Barni, & Magrin, 2011). Lefcourt (2002) has summarised research on humour as a stress moderator, describing it as a tool by which one can reframe an otherwise overwhelming event and provide alternative emotional responses.

#### *1.7.6.3 Social support*

Social support and seeking social support are consistently found to relate to posttraumatic growth (Prati & Pietrantonio, 2009). In Calhoun et al.’s (2010) comprehensive model of posttraumatic growth, social support is depicted as influencing the constructive rumination that occurs while individuals are searching to make sense of a trauma and find significance for their life. In Joseph and Linley’s (2005) organismic valuing theory of growth through adversity, the social environment is important for helping or hindering individuals to pursue their goals of autonomy, relatedness, and competence in order to gain fulfilment. Where social contexts are supportive, individuals are more able to follow their organismic valuing processes that guide the search for fulfilment and support authenticity. This leads to posttraumatic growth.

The stress-buffering hypothesis posits that social support aids in stress relief in challenging times (Cohen & Wills, 1985) and thus may make room for processing traumatic events with the support of others. As noted already, social support factors have been found to interact

with other personal resources and level of stress, to predict higher posttraumatic growth. Higher perceived social support and personal resources such as optimism predict higher levels of posttraumatic growth, where active coping is used and the intensity of the stressor is higher (Armeli et al., 2001; Cadell et al., 2003; Kinsinger et al., 2006). Likewise, increased social support after sexual assault has been noted to relate to increased posttraumatic growth, along with active coping, religious coping, and perceived control over recovery (Frazier et al., 2001).

In examining the role of social support in growth, different aspects of the support have been investigated. Such components of social support include the perception of available support, the support received, emotional and instrumental social support, the perceived reaction to disclosures within a relationship, the size of a social network, and the behaviour of seeking social support.

Feeling connected to others, and the simple degree of association with others, have been found to relate to higher posttraumatic growth in North American former prisoners of war, along with positive affect (Erbes et al., 2005). In research with child survivors of the Holocaust, Lev-Wiesel and Amir (2006) found that a sense of social support was associated with more posttraumatic growth, and that generally the higher the level of perceived social support, the fewer posttraumatic stress disorder symptoms, excepting the level of arousal, which was positively associated with posttraumatic growth. Measures of social support examined instrumental and emotional support from family and friends, being the helper, and cognitive support. The authors suggested that the level of arousal might be translated into a sort of nervous energy that gave impetus to actions, which could enhance self-efficacy and mastery. Thus, arousal could feasibly be related to posttraumatic growth.

Schroevers, Helgeson, Sanderman, and Ranchor (2010) studied three aspects of social support in cancer survivors: perceived availability of social support, dissatisfaction with social support, and emotional social support received at 3 months after diagnosis and 8 years later. They found that only received emotional support (problem solving, reassuring, and comforting) at 3 months was related to greater perception of positive change, indicating that it is not solely the perception of having support available that aids the process of posttraumatic growth.

Different sources of social support have been found to differentially facilitate posttraumatic growth. Bozo, Gündoğdu, and Büyükaşık-Çolak (2009) examined the associations of social support (provided by friends, family, and significant others) to optimism and growth in a sample of Turkish women after operations to remove breast cancers. All sources of social support were associated with posttraumatic growth; however, higher dispositional optimism was associated with more posttraumatic growth, and support from a significant other moderated the association between optimism and posttraumatic growth. This indicated that those who were low in optimism were unlikely to develop posttraumatic growth even if they perceived their partner to be very supportive. Those who were higher in optimism were most likely to report posttraumatic growth if they perceived their partner as supportive.

Further, the responses of others to disclosure in social circumstances are important to the process of posttraumatic growth. Where an individual feels supported and heard on disclosure of their struggles and emotions, growth is encouraged and relationships strengthened; where responses are dismissing or negative, growth is stunted and further disclosure discouraged (Calhoun & Tedeschi, 2006). In a group of Japanese students reporting on a range of traumatic life events within the prior 10 years, Taku, Tedeschi, Cann, and Calhoun (2009) examined distress, social support, and perceived response to disclosure of the trauma to supports. Those who disclosed the trauma reported higher posttraumatic growth than those who did not; those who reported responses from others as sympathetic, listening, mutually disclosing, and encouraging reported the highest posttraumatic growth, especially in the domains of Relating to Others and Personal Strength. Those who reported mutual disclosure showed higher posttraumatic growth than those who received negative responses from another (confused, mocking, dismissive). They also reported more distress than those receiving a positive, supportive response from their confidante, indicating that mutual disclosure could provide an environment both stressful and nurturing for a trauma survivor. These findings also provide further support for the co-existence of distress and posttraumatic growth.

Role models also appear to play a role in supporting posttraumatic growth socially. A study with survivors of breast cancer examined whether participants had contact with another woman who had perceived benefits from her experience. Those who had social contact with such a woman reported more posttraumatic growth (T. Weiss, 2002). It is possible that

modelling of posttraumatic growth facilitated hope and optimism in the face of trauma, and that this encouraged growth in participants. Second, participants may have had a greater sense of support and connection from someone who had experienced similar troubles; this may have provided opportunities to disclose their struggles to a person perceived as safe.

Not only does the support itself relate to posttraumatic growth, but also the behaviour of seeking support has been found to be a coping behaviour in itself and to relate to growth. Such seeking behaviour may overlap with active styles of coping, concepts of self-efficacy, and the knowledge that such support is available. In Morris and Shakespeare-Finch's (2011) research with cancer survivors, structural equation modelling showed both seeking social support and deliberate rumination after diagnosis to be associated with posttraumatic growth, whereas intrusive rumination and the severity of the trauma were associated with more distress, but not with posttraumatic growth. Support seeking was also related to posttraumatic growth indirectly through rumination, suggesting that social interaction could encourage discussion and rumination on benefits of the struggle with trauma. Social support also related to intrusive rumination and consideration of life purpose, and these constructs were associated with increased distress. The authors suggest that social support perhaps also reminds trauma survivors of their predicament, and therefore can increase distress. As other research indicates distress and posttraumatic growth often co-exist and rumination is often associated with processing what may be a painful event, this explanation is plausible.

Finally, some research has been conducted on attachment styles and posttraumatic growth in Middle Eastern survivors of torture. Findings show that survivors with secure attachment styles and higher exposure to torture showed more growth; however, where attachment styles were insecure, higher torture exposure predicted more negative emotion (Punamäki, 2010). Although it seems logical to suppose that attachment may influence social connections and thus posttraumatic growth, attachment has not been found to be associated with social support in posttraumatic growth research. For example, in studies with North American cancer survivors, Schmidt, Blank, Bellizzi, and Park (2012) found that secure attachment was related to posttraumatic growth, positive reframing, active coping, and religion. However, secure attachment and posttraumatic growth were not related to social support in this study, and positive reframing and religion mediated the association between attachment and posttraumatic growth, suggesting that a secure attachment may influence many facets of the

posttraumatic growth process. In a study with Finnish students after a school shooting, avoidant attachment styles predicted less posttraumatic growth than did secure and anxious attachment styles (Turunen, Haravuori, Punamäki, Suomalainen, & Marttunen, 2014). For those with insecure attachments, it seems that posttraumatic growth can still be seen. Arikan and Karanci (2012) found that in a sample of Turkish university students who had been exposed to the Marmara earthquake in 1999, insecure-anxious attachments were associated with more posttraumatic growth. This association was partially mediated by a coping style where acceptance of events as fate was dominant. Thus, it is possible that attachment styles may either predispose certain coping styles that produce posttraumatic growth, or that when certain coping styles and attachment styles interact, posttraumatic growth is an outcome of coping.

### ***1.7.7 Demographic factors***

The meta-analysis by Helgeson et al. (2006) that took into account several correlates of growth and benefit finding indicated that women, younger people, and ethnic minorities report more growth than men, older people, and those in the ethnic majority. In posttraumatic growth models, such demographic factors are not explicitly accounted for, although they may be placed in the ‘individual differences’ pre-trauma in Calhoun et al.’s (2010) model that influence the process of posttraumatic growth.

#### ***1.7.7.1 Gender***

Women are generally found to report higher levels of posttraumatic growth than men. In the development of the Posttraumatic Growth Inventory (1996), Tedeschi and Calhoun noted that, in addition to reporting higher levels of total posttraumatic growth, women reported significantly higher scores on some subscales of the inventory: New Possibilities, Relating to Others, Personal Strength, and Spiritual Change. A meta-analysis focusing solely on gender differences in posttraumatic growth (Vishnevsky et al., 2010) found a small to moderate gender difference in the 70 studies accrued, with women reporting more growth than men. They examined possible moderating influences, such as average age of the sample, tools used to measure growth, language of the study, nature of the trauma, and type of sample (university students, community sample, or other). Age significantly moderated growth in women, such that older women showed slightly more growth than younger women. The

authors speculate that women may show more growth because they have been found to ruminate more than men, both deliberately (reflectively) and negatively (brooding) (Treyner, Gonzalez, & Nolen-Hoeksema, 2003). Women are also more likely to engage in coping strategies than men (Tamres, Janicki, & Helgeson, 2002), specifically using emotion-focused coping, such as positive self-talk and seeking emotional social support (Vingerhoets & Van Heck, 1990), and religious coping (Prati & Pietrantonio, 2009), which have been found to relate to posttraumatic growth (Helgeson et al., 2006).

It has been suggested that women may perceive trauma as more threatening in some circumstances and experience a more intense sense of loss of control, thereby experiencing more distress in the face of trauma (Olf, Langeland, Draijer, & Gersons, 2007). Although the authors noted this contributed to women experiencing higher rates of posttraumatic stress disorder, it is pertinent to consider it alongside gender differences in posttraumatic growth. A meta-analytic review of coping, stressor appraisal, and gender by Tamres et al. (2002) found that, for studies in which women found the stressor more severe than men, women used more coping effort for four out of seven coping strategies examined (active coping, positive reframing, avoiding, and self-blaming). Women's use of strategies such as isolation, rumination, and seeking support did not change in relation to the severity of stressor appraisal. Women's distress and resulting coping responses may in part support the posttraumatic growth process, where active coping and positive reframing have been noted to be associated with posttraumatic growth (Armeli et al., 2001; Wild & Paivio, 2003).

Additionally, emotional intensity may influence the expression of negative emotions as well as that of positive emotions. Affect intensity refers to the intensity of an individual's response to an emotionally provoking event or stimuli. One study suggested that individuals who report a greater intensity of negative emotion also tend to report a greater intensity of positive emotion (Larsen & Diener, 1987). It is possible that women experience emotions more intensely than men, and this could account for women's reports of more intense negative emotions in addition to more intense happiness and positive emotions. Fujita, Diener, and Sandvik (1991) explored the possibility that women may experience both more joy and more sorrow than men, in a sample of 136 North American citizens. They used measures of affect intensity and hedonic level (the duration of affective states) and found greater intensity of affect for women than for men. Specifically, women reported more intense sadness and



happiness about past life events, and more intense affect in everyday emotions; the reports of intensity of everyday emotions were corroborated by positive correlations with a measure of how a friend or family member expected the participant to describe their emotional intensity (Fujita et al., 1991). The authors considered their findings in light of other studies that found that individuals with high affect intensity were more likely to use such cognitive operations as personalising, overgeneralising, and selective abstraction (Beck, 1979) for both negative and positive events (Larsen, Diener, & Cropanzano, 1987). Cognitive actions such as personalising involve an individual taking personal responsibility for events; overgeneralising refers to interpreting one event as representative of all events; selective abstraction involves particular attention to specific elements of a situation, which often provoke emotion. These findings suggest that such thinking styles are associated with a more intense experience of emotion. It is thus feasible that gender differences in affect intensity could relate to gender differences in rumination, with women being more likely to dwell on their experiences and emphasise particular emotional aspects, both positive and negative. Women may also take more personal responsibility for such events and see them as more generally representative of the world. In this light, it is also possible that affect intensity contributes to posttraumatic growth.

Further, a recent examination of the association between gender, cancer experiences, and internet use (Seale, Ziebland, & Charteris-Black, 2006) found that on cancer-support web forums, women with breast cancer were more likely than men with prostate cancer to use keywords associated with feelings (e.g., 'feel', 'need', 'scared', 'brave') and more likely to use superlatives (e.g., 'wonderful', 'amazing', 'lots', 'marvellous'), suggesting greater emotional expressivity in women when using web support forums. It is possible that women simply express their emotions more freely than men, whether this is a function of socialisation or otherwise. A study by Simon and Nath (2004) of 1,460 North Americans examined the reported frequency of a range of 19 positive and negative emotions (e.g., contented, excited, anxious, and lonely). The study found no significant gender differences in the reported frequency of emotions in general, but men reported being happy more, and women reported being sad more. Men reported 'keeping feelings to oneself' more than women. It is unclear what association this emotional concealment may have with actual experience of emotion. Mirowsky and Ross (1995) noted that such a measure of emotional

concealment related to increased sadness in males and females. The findings of these studies imply that, although men and women do not differ in the frequency of their reported emotions, a higher intensity of emotion (both negative and positive) is reported by women. Whether this is a function of more social ease in women reporting intense emotions, or a reflection of more intensely felt affect, remains to be ascertained. For posttraumatic growth, there may be some parallels with women reporting both more posttraumatic growth and more distress associated with traumatic events.

A recent study after the Wenchuan earthquakes in 2008 examined rates of posttraumatic stress disorder and posttraumatic growth by gender and found that women reported more posttraumatic stress disorder symptoms and more posttraumatic growth (Jin, Xu, & Liu, 2014). On examining the associations among gender, posttraumatic stress disorder, and posttraumatic growth, the authors noted a different curve for men and women; women showed a 'U' curve association between posttraumatic growth and posttraumatic stress disorder. They reported more posttraumatic stress disorder symptoms at high levels of posttraumatic growth *and* at low levels of posttraumatic growth, and lower levels of posttraumatic stress disorder symptoms at moderate levels of posttraumatic growth. Men reported more posttraumatic growth at higher levels of posttraumatic stress disorder, showing more of an 'S' curve where lower posttraumatic growth related to low numbers of posttraumatic stress disorder symptoms, moderate posttraumatic growth related to increasing numbers of posttraumatic stress disorder symptoms, and high posttraumatic growth related to a plateau of posttraumatic stress disorder symptoms. These findings are intriguing and suggest a difference in response to distress, according to gender, that may influence levels of posttraumatic growth. However, because the study is cross-sectional it is not possible to deduce any causal associations between posttraumatic stress disorder experiences and posttraumatic growth. Further research is needed to clarify the reasons that higher posttraumatic growth is related to more posttraumatic stress disorder symptoms for some women, but not for all women.

One study of the effects of the Christchurch earthquakes has shown gender differences in both perception of distress and in reports of positive outcomes from earthquake experiences. Fergusson et al. (2014) interviewed participants in the Christchurch Health and Development Study, a 35-year longitudinal study (Fergusson, Boden, & Horwood, 2015). They developed

measures of exposure to earthquakes, distress caused by earthquakes, and positive consequences from earthquake experiences. Distress encompassed fear responses during the earthquakes, distress over damage to homes, injury to self or others, and disruption caused by the earthquakes (such as changes to housing, job situations, schools, and communities, and provision of water, electricity, and sewerage). Positive consequences included improved relationships, increased appreciation of life, and increased maturity of one's children. This study found that greater exposure to earthquakes (defined as damage to property, land, infrastructure, and buildings) related to greater distress because of fear, injury, damage to homes, and disruption. Females showed more distress because of earthquake exposure and disruption than males, and females also reported more positive consequences. There was a gender-exposure interaction such that females reported more distress than males at higher levels of exposure.

It is possible that men and women experience and respond to distress differently, producing different patterns of growth according to gender. Research with university students after a wide range of traumas indicates that men and women do not show the same pattern of association between posttraumatic stress disorder and posttraumatic growth. A linear association between posttraumatic stress disorder symptom severity and posttraumatic growth was found for men; for women, a curvilinear association was found, such that moderate levels of recalled posttraumatic stress disorder at the time of trauma were related to more posttraumatic growth. Thus, higher and lower levels of distress predicted less growth, whereas moderate levels of distress predicted more growth in women (Hwang, 2012).

It may be that gender differences in the experience of distress also play a part in the different expressions of posttraumatic growth. Women have been found to report more frequent distress (anger, sadness, anxiety, malaise, and physical aches) when controlling for emotional expressivity, than men. However, they report happiness just as frequently (Mirowsky & Ross, 1995). In the case of stressful life events, women also report being significantly more affected by deaths and by others' crises, with more associated symptoms of depression (Kessler & McLeod, 1984). Although positive affect about life events was not measured, it is possible that there are differences in the way women and men appraise and respond to stressful life events and that these different responses may be pertinent to consider in the equation of the posttraumatic growth process after a trauma.

In summary, findings from many studies show that women consistently report higher levels of posttraumatic growth than men; women also experience more distress in the face of some traumatic events, and gender can influence coping strategies and rumination. It is possible that gender may influence perceptions and experiences of stressors, with women being more likely to apply coping strategies to their situation, to struggle to make sense of trauma, and to incorporate trauma into their prior worldview. As such, this process would lead to higher levels of posttraumatic growth. Qualitative research may be able to shed light on the nature of different experiences of distress and posttraumatic growth according to gender.

#### *1.7.7.2 Age*

Helgeson et al. (2006) found, in their meta-analysis of studies of posttraumatic growth after a range of trauma, that younger people tended to report more posttraumatic growth. Perhaps the extent that younger people perceive trauma as a threat to their mortality or worldview accounts for greater reports of posttraumatic growth. A review of 29 studies on posttraumatic growth after cancer by Stanton et al. (2006) indicated that most did not find an association between age and posttraumatic growth, but seven of the 19 studies (e.g., Lechner et al., 2003) did report that younger participants showed more growth than older participants. An inverse association between age and posttraumatic growth has been found in HIV patients (Milam, 2004).

It appears that age is not always a significant predictor of posttraumatic growth, but where an association does appear, age is inversely related to posttraumatic growth.

#### *1.7.7.3 Education and socioeconomic status*

Some speculate that access to more resources allows more possibility to realise growth, or that those in higher socioeconomic brackets might perceive an event as more stressful because of the probability that they experience fewer everyday hardships than those in lower socioeconomic brackets and this may make a new hardship more overwhelming. This, therefore, would provide more opportunity for cognitive processing and coping that may lead to posttraumatic growth (Bower et al., 2005).

Research supporting these theories is mixed. Stanton et al. (2006) reviewed correlates of posttraumatic growth in individuals who had cancer or who were survivors of cancer. They

noted that some studies found that higher socioeconomic status related to higher levels of posttraumatic growth in women who had completed cancer treatment but not in those undergoing treatment. Other studies, however, reported non-significant associations between socioeconomic status and growth, indicating that socioeconomic status does not consistently relate to posttraumatic growth. T. Weiss (2002) found that levels of education did not impact significantly on the expression of posttraumatic growth; however, when comparing individuals whose highest level of education was high school, those with high school-only education were more likely to report posttraumatic growth than those who had been further educated.

It is possible that education relates differently to posttraumatic growth than socioeconomic status does, as socioeconomic status could emerge from inherited privilege, in contrast to higher education allowing individuals to gain better-paid employment. Education and socioeconomic status may overlap where those with access to more funding may more easily afford education and may afford more expensive education. In New Zealand, a university education is not necessarily needed to gain well-paid employment. Thus, the process of education can be separate from the process of making a living for oneself, and individuals in the same socioeconomic bracket may have different characteristics and history, conflating education with socioeconomic status. Therefore, it is of interest to further investigate whether education influences posttraumatic growth in a New Zealand context.

### **1.7.8 Culture**

Culture has been described as a “socially constructed constellation consisting of such things as practices, competencies, ideas, schemas, symbols, values, norms, institutions, goals, constitutive rules, artefacts, and modifications of the physical environment” Fiske (2002, p.85). Culture is assumed to transmit through social interactions with others. As such, where influences on ideas, schemas, norms, and values differ across cultures, one would expect them to influence posttraumatic growth accordingly. Calhoun et al. (2010) suggest that culture shapes idioms that individuals use in everyday interactions of growth, trauma, and coping. Likewise, cultural norms influence expectations of how trauma may play out, how best to face it, and how growth might develop and be acknowledged. Such cultural differences in coping and perception of trauma have been summarised by reviews of cross-cultural research on coping (Kuo, 2011). Thus, growth may be malleable to differences in the

broader cultural themes and how available these are to an individual's 'primary reference groups' such as family and close friends.

Cultural influences can be proximate, coming from interactions with others, or distal, coming from sources such as media. Proximate influences can be transferred through positive or negative responses from others, as reinforcing or punishing behaviour, respectively. Second, individuals can share ideas about the world and the meaning of suffering. For example, Buddhist rhetoric views both suffering and pleasure as inevitable parts of life that will pass, and suffering can also be brought about by attempts to make permanent something that is by nature transient (Rubin, 1996). Thus, when two individuals of Buddhist faith discuss a matter of suffering in this context, one may encourage the other to 'sit with suffering' in an attempt to be aware of their experiences without judgement, attachment, or aversion. Other cultural viewpoints engender slightly different approaches to suffering: the phrase used by some in the Judaeo-Christian faith that 'everything happens for a reason', noted by researchers (Calhoun et al., 2010) and lay people alike (Hunt, 2014), assumes a meaning behind events, a lesson behind suffering guided by God's master plan. Such ways of interacting with others over suffering may influence one's own perception and response to suffering. In addition, social norms of a family or friend group may subtly dictate which coping behaviour is acceptable and helpful, including levels of disclosure and emotional expression (Calhoun et al., 2010).

Distal cultural influences include themes and stories that can be pertinent to the process of posttraumatic growth. For example, stories are often told about people who have successfully overcome hardship and taken something from their experiences. Such stories can encourage problem solving, hard work, persistence, and learning from setbacks. Examples include stories of Michael Jordan's persistence in his chosen career of basketball despite being turned down for his university team, and J. K. Rowling's success as an author despite her struggles as a single mother and her book being rejected by several publishers before its acceptance (Horton, 2015). Such stories can be shared through formal media and social media, voicing and reinforcing cultural themes.

Additionally, the collective or individualist nature of a society is thought to influence the individual within that society. Individualist cultures are thought to nurture autonomy and encourage prioritising the individual's needs and wants before those of the larger group.

Collectivist cultures are considered to foster a sense of duty to the larger social group, prioritising harmony and cohesion over meeting the needs of the individual (Triandis, Bontempo, Villareal, Asai, & Lucca, 1988). Although some cultures considered more collectivist are thought to foster interdependence, and more individualist cultures are thought to foster individualism, nations can be heterogeneous and context can influence norms and values. It is not possible to assume that citizens from a certain country adhere to collectivist or individualist values simply because of their country of residence (Fiske, 2002). As an alternative, measurement of an individual's endorsement of independent or collective values can shed some light on how these values play out in a personal context. At an individual level, those who endorse collectivist values are known as 'interdependent' and those endorsing individualist values as 'independent' (Matsumoto, Takeuchi, Andayani, Kouznetsova, & Krupp, 1998). Interdependent individuals are more likely to consider themselves in terms of their relationships; thus, they may think more about how their actions might be perceived by others, and this may influence their thinking about how they should process the trauma and what might be helpful for the group, rather than solely for themselves (Cross, Morris, & Gore, 2002). Further, collectivist and individualist values measured at the individual level were found to predict the extent of displaying seven emotions in relationships with friends, colleagues, strangers, and family. Specifically, interdependent participants reported showing more happiness, surprise, sadness, and fear in family and colleague relationships, and less anger, disgust, and contempt (Matsumoto et al., 1998). In disclosing to others in the wake of trauma, these cultural differences may influence the nature of the association between social support and posttraumatic growth.

The few studies that have compared posttraumatic growth in different countries indicate that posttraumatic growth may differ in nature and extent depending on the country. For example, Australians report moderate levels of growth ( $M = 56.94$ ) in contrast to North Americans, reporting higher levels of growth ( $M = 83.16$ ). Australians also report most growth in Appreciation of Life and least growth in Spiritual Change compared to North Americans, for whom Spiritual Change is a significant part of posttraumatic growth (Calhoun & Tedeschi, 1998; Morris et al., 2005). The make-up of a society in the proportion of citizens identifying as religious may influence responses to questions regarding spiritual growth through norms, broad cultural themes, and conversations. Research comparing North American and Japanese

citizens on measures of religiosity, optimism, and posttraumatic growth shows that North Americans report more posttraumatic growth than Japanese, and that stronger religious belief predicted higher posttraumatic growth in North American but not in Japanese samples (Taku & Cann, 2014). The authors speculate that in Japan there may not be as dramatic a difference between identifying as religious or non-religious as there may be in the USA. Thus, cultural elements may modify the ways certain factors predict posttraumatic growth.

In the process of posttraumatic growth, culture may influence the content and frequency of rumination, as well as the tendency to self-disclose to others. Examination of the association between rumination and posttraumatic growth in North American citizens and Japanese citizens showed that, in both samples, recent deliberate rumination predicted higher posttraumatic growth, whereas deliberate rumination after a stressor had a stronger association with posttraumatic growth in the Japanese sample than in the North American sample (Taku, Cann, Tedeschi, & Calhoun, 2009). Westerners may be more likely to take responsibility and credit for influencing event outcomes, whereas those with Eastern backgrounds may be more likely to search for ways to adjust to events (Choi, Nisbett, & Norenzayan, 1999; Morling, Kitayama, & Miyamoto, 2002). For responses to disasters, individuals with Western influences may be more likely to search for reasons why they were affected and consider their actions as instrumental in the circumstances; it is possible that perceptions of personal growth may be stronger and more pertinent amongst individuals in more Westernised countries.

To summarise, culture influences individuals through distal sources (e.g., media) and proximal sources (e.g., one's social circle). Additionally, culture promotes individualist or collectivist values that shape worldviews, priorities, and social interactions. In this way, culture contributes to the process of posttraumatic growth and the way posttraumatic growth is expressed: culture will contribute to one's worldview prior to a trauma and to the likely strategies one uses to respond to the trauma and construct a new worldview.

### ***1.7.9 Summary of factors related to posttraumatic growth***

Posttraumatic growth has been found to relate to psychological wellbeing (meaning and self-realisation) and other aspects of wellbeing, such as self-esteem, positive affect, and life satisfaction. A longer time after trauma predicts a stronger association between posttraumatic



growth and these aspects of wellbeing (Helgeson et al., 2006). Indeed, over time the associations among posttraumatic growth and other aspects of wellbeing vary, and likely are influenced by coping strategies such as seeking social support or using humour and acceptance (Silva, Crespo, & Canavarro, 2012). The relation between posttraumatic growth and adjustment is still unclear, likely because adjustment has been conceptualised differently in many studies.

Posttraumatic growth exists alongside aspects of distress. Some elements of distress such as posttraumatic stress disorder symptoms have been noted to precede posttraumatic growth (e.g., Dekel et al., 2012) as well as co-exist with posttraumatic growth (Taku et al., 2008). However, the association between posttraumatic stress disorder symptoms and posttraumatic growth is still not well understood. A clearer positive relation between peritraumatic distress and posttraumatic growth is seen in the few studies that have examined this to date. Likewise, higher levels of posttraumatic growth have been consistently linked to higher perceived threat of the trauma and higher objective severity of the threat. Current research suggests that posttraumatic growth may ease concurrent depression through mechanisms that are not yet well understood. It is not yet clear whether prior life stressors contribute to current posttraumatic growth or not. Further, the little research comparing posttraumatic growth after different traumas suggests there is a qualitative difference in how posttraumatic growth is expressed after different trauma types, but qualitative differences in posttraumatic growth have not yet been explored after earthquake-related trauma.

Women are generally found to report higher levels of posttraumatic growth than men. As yet, the reasons for this are unclear. Women are more likely to engage in a range of behaviours that support posttraumatic growth, such as support seeking, rumination, and religious coping. They may respond to traumatic events with higher levels of distress and expressed emotion. Thus, gender may influence posttraumatic growth through a variety of pathways.

Personality factors such as optimism, extraversion, openness to experience, agreeableness, and conscientiousness have been found to be associated with posttraumatic growth (Linley & Joseph, 2004). Optimism may also influence other aspects of an individual's functioning, such as positive reappraisal, active coping, and seeking social support, and these factors in turn promote posttraumatic growth. Spirituality and religiosity have been found to relate to higher levels of posttraumatic growth, perhaps because spiritual frameworks provide a way of

understanding the world; religion provides community and social support; spirituality provides methods of responding to trauma such as meditating or praying; or perhaps because religiosity relates to other facets of individual functioning, such as gratitude, that may promote posttraumatic growth.

Rumination is consistently linked to posttraumatic growth, such that both intrusive rumination soon after a trauma and voluntary rumination at a later time relate to higher levels of posttraumatic growth.

Social support promotes posttraumatic growth where the responses of others to disclosure are supportive and the individual feels heard. Seeking social support relates to higher posttraumatic growth and also influences levels of rumination, so that the mechanisms of social support encouraging posttraumatic growth may be many.

Culture likely affects posttraumatic growth through cultural narratives and norms. However, the particular influences of culture on growth have not yet been measured.

The current thesis addresses the question of whether and how posttraumatic growth might be associated with these factors in individuals coping well after trauma. Aspects of distress during and after the trauma are examined separately for the sample, so that each association can be clearly examined. The association between gender and posttraumatic growth is also examined in the sample, comparing men and women's posttraumatic growth after earthquake-related traumas. The association between social adjustment and posttraumatic growth is examined for the sample. Finally, reports of earthquake experiences and posttraumatic growth are examined to ascertain whether any qualitatively different experiences of posttraumatic growth are reported after the Canterbury earthquake sequence as opposed to other trauma types in other locations.

## **CHAPTER 2**

### **Unanswered questions in the posttraumatic growth research to date**

#### **2.1 Resilience and posttraumatic growth**

The association between resilience and posttraumatic growth has rarely been examined, and the two constructs often are conflated. Current models of posttraumatic growth do not clearly outline how resilience might influence the posttraumatic growth process. Theories posit that higher resilience may relate to lower posttraumatic growth, as highly resilient individuals may not be distressed by a stressful event and therefore have no shattered worldview and no need to reconstruct it. Where resilience and posttraumatic growth have been compared in research to date, resilience has largely been equated to a lack of psychopathology and conceptualised on a scale of posttraumatic stress disorder symptoms; resilience has rarely been measured and compared to posttraumatic growth. However, resilient individuals have been found to use different coping strategies and approaches than less resilient individuals, and this may indicate a qualitatively different aspect of functioning in adversity that may in turn produce posttraumatic growth in its own way. Janoff-Bulman's (2004) theory that resilient individuals may exhibit posttraumatic growth, even though their worldviews may not have been challenged, remains to be tested; this theory proposed that individuals might be more likely to show growth in the domain of the self, as this might occur outside of shattered worldviews.

##### ***2.1.1 Unanswered question: How does resilience influence posttraumatic growth?***

Posttraumatic growth in groups of individuals coping well after trauma has not specifically been measured to date, and therefore there is no evidence to support or refute the theory that more resilient people show no posttraumatic growth.

The studies in the current thesis use a sample coping well after trauma to focus on participants more likely to exhibit resilience. Thus, variation in levels of resilience in a sample 'coping well' can be examined for a possible association with posttraumatic growth.

#### **2.2 Distress, threat, and posttraumatic growth**

Models and theories of posttraumatic growth specify emotional distress as a component of the posttraumatic growth process, but neglect to consider which types of distress might

influence posttraumatic growth in which ways. Existing research has shown a complex association between elements of distress and posttraumatic growth that differs according to the type of distress measured. Posttraumatic stress disorder and posttraumatic growth appear to co-exist, perhaps sharing some predictive factors (Shakespeare-Finch & Lurie-Beck, 2014). Positive correlations are commonly noted between perceived stressfulness of events and posttraumatic growth (Helgeson et al., 2006), but not always between objective severity of threat and posttraumatic growth (Stanton et al., 2006). Further, the influence of prior stressful life events on current posttraumatic growth is unexplored.

**2.2.1 *Unanswered question: How do threat severity, perceived threat, peritraumatic distress, ongoing earthquake-related distress, and prior stressful life events relate to posttraumatic growth?***

Few studies have examined the association between peritraumatic distress and posttraumatic growth. It is also possible that perceived threat is more important than the objective severity of the threat when it comes to predicting posttraumatic growth. Further, the influence of ongoing distress and of prior stressful life events on posttraumatic growth have not been explored.

The studies in the current thesis expand on this research area and inform models of posttraumatic growth as to how different elements of distress influence posttraumatic growth in individuals coping well after trauma.

**2.3 Gender and posttraumatic growth**

Gender differences have also consistently been noted in posttraumatic growth and distress, with women reporting higher posttraumatic growth (Vishnevsky et al., 2010), higher rates of posttraumatic stress disorder symptoms, and more negative affect in response to stressful events. Some studies have reported interactions between gender and age affecting levels of posttraumatic growth.

**2.3.1 *Unanswered question: What are the associations among gender, age, distress, and posttraumatic growth?***

Few studies have investigated gender differences in the association between posttraumatic growth and perceived event stressfulness (Fergusson et al., 2014; Hwang, 2012), and none have examined gender differences in the association between reported peritraumatic distress

and posttraumatic growth. It is not yet clear why posttraumatic growth might be different for women, and whether factors influencing the perception of trauma and the posttraumatic growth process differ between sexes.

The studies in the current thesis measures a variety of aspects of distress to examine the association of gender, distress, and posttraumatic growth. Age is examined as a possible influence on the association between gender and posttraumatic growth.

## **2.4 Social adjustment and posttraumatic growth**

Measures of adjustment have not been consistently found to relate to posttraumatic growth, likely because definitions of adjustment have varied in research. Thus, it is unclear how social adjustment might relate to posttraumatic growth, as social adjustment refers to adjustment to work and social roles and also includes aspects of contentment with work, family, and romantic relationships. A related but distinct construct, social support, has been widely explored in posttraumatic growth research. Models of posttraumatic growth posit that social support is an important influence in the processing of a trauma during the posttraumatic growth process. Research has shown equivocal findings on how social support might function to facilitate posttraumatic growth, with different aspects of social support being measured, such as level of social support received, satisfaction with support, and extent of seeking social support.

### ***2.4.1 Unanswered question: How might social adjustment relate to posttraumatic growth?***

Social adjustment has not been specifically examined in association with posttraumatic growth. Such a construct may provide more information on which elements of adjustment and social functioning relate to posttraumatic growth in individuals coping well.

The studies in the current thesis measure social adjustment in work, social, family, and romantic contexts, and examine how social adjustment might relate to posttraumatic growth.

## **2.5 Education and posttraumatic growth**

It is not yet clear how levels of education might influence posttraumatic growth, as many studies have equated education with socioeconomic status, which is not a valid comparison in New Zealand society.

### ***2.5.1 Unanswered question: How might education relate to posttraumatic growth in a New Zealand sample?***

The studies in the current thesis measure level of education and analyse whether levels of posttraumatic growth vary according to education level.

## **2.6 Culture, nature of the trauma, and posttraumatic growth**

Research and theory suggest that culture and the nature of a trauma may influence the extent and expression of posttraumatic growth, as well as other factors involved in the process.

Earthquakes and posttraumatic growth have been examined in China after the 2008 Wenchuan earthquake and in Turkey after the 1999 Marmara earthquake, but no studies have examined posttraumatic growth using a widely used and validated scale, after an earthquake in a Western society.

### ***2.6.1 Unanswered question: Which aspects of posttraumatic growth appear to be influenced by culture or the nature of earthquake-related trauma?***

The studies in the current thesis explore aspects of culture and earthquake-related trauma through qualitative analysis of earthquake narratives in Study 2.

## **2.7 PhD Aims**

### ***2.7.1 Study 1***

Study 1 examines the association between posttraumatic growth and resilience in a sample of New Zealanders coping well after earthquake trauma. Findings can be used to support or refute theories that posttraumatic growth is an aspect of resilience, that it contributes to increased resilience, that resilience influences particular domains of posttraumatic growth, or that posttraumatic growth and resilience are separate constructs in individuals coping well.

Study 1 measures and explores associations between variables using statistical (or quantitative) analyses. Associations among earthquake-related distress, gender, social adjustment, education, age, and posttraumatic growth are examined for the current sample. Associations among non-clinical distress, severity of traumatic exposure, stressful life events, and posttraumatic growth are examined. The findings add to the little research available on the association of different aspects of distress and posttraumatic growth in a population coping well after trauma.

Study 1 adds to research by shedding light on the role of social adjustment in the posttraumatic growth process in individuals coping well after trauma. Findings inform theory by exploring whether social adjustment relates to posttraumatic growth, as in Calhoun et al.'s (2010) model which postulates that posttraumatic growth relates to greater wellbeing and more social support. Study 1 also examines the association between posttraumatic growth and education in a New Zealand context, where findings in research to date have been equivocal. Further, the impact of gender on the association of different measures of distress and posttraumatic growth is explored. This has the potential to contribute to understanding of possible gender differences in types of distress (such as peritraumatic distress, distress from earthquake events, and difficulty with life events) and how these might relate to posttraumatic growth, which has not been examined in research to date. Findings will further inform theory as to how posttraumatic growth is exhibited in resilient individuals, and, where models posit that distress is integral to the posttraumatic growth process, findings will explore which aspects of distress this is true for.

### **2.7.2 Study 2**

Study 2 uses qualitative analysis to examine the experience of posttraumatic growth in the same sample of New Zealanders coping well after earthquake events. The study examines descriptions of the earthquake experiences, coping strategies, and posttraumatic growth. Factors are highlighted that participants describe as important for the development of posttraumatic growth. Study 2 also further explores possible differences in descriptions of posttraumatic growth and distress between genders. No hypotheses for the qualitative analysis conducted for Study 2 are proposed, because of the lack of prior qualitative research with earthquake survivors. Such a paucity of previous research calls for an approach to qualitative analyses where data are examined for themes without preconceived expectations of which themes will be found.

Findings inform theory by expanding on how type of trauma, in this case earthquake trauma, influences the kinds of positive changes exhibited in the aftermath. Findings also provide evidence and examples of how individuals might engage in the organismic valuing process while responding to trauma, and how this process can lead to posttraumatic growth.

## **2.8 Hypotheses**

The following hypotheses are proposed for Study 1:

Hypothesis 1: Posttraumatic growth will show a negative association with resilience, such that higher resilience will relate to lower levels of posttraumatic growth.

Hypothesis 2: Moderate levels of distress will be associated with more posttraumatic growth than low or high levels of distress.

Hypothesis 3: Objective severity of threat exposure will relate positively to posttraumatic growth.

Hypothesis 4: Posttraumatic growth will be negatively correlated with the Social Adjustment Scale subscales of Interpersonal Behaviour and Feelings of Satisfaction (higher scores on the Social Adjustment Scale indicate greater impairment).

Hypothesis 5: Gender and age will interact, such that age will not influence posttraumatic growth in men, but older women will show higher levels of posttraumatic growth.

Hypothesis 6: Women will score more highly on the Posttraumatic Growth Inventory, particularly on the subscales of Relating to Others, New Possibilities, Personal Strength, and Spiritual Change.

Hypothesis 7: Women will report more distress in response to the earthquakes and life stressors; this will relate to higher posttraumatic growth. Curvilinear associations between distress measures and posttraumatic growth will be stronger than linear associations.

### **2.8.1 Exploratory questions**

Given the mixed findings on associations of demographic factors, prior life stressors, and posttraumatic growth, three further exploratory questions are included.

1: Whether the number of life stressors in the 5 years and 6 months prior to assessment relate to levels of posttraumatic growth.

2: Whether posttraumatic growth relates to education.

3: Whether peritraumatic distress, number of earthquake-related traumatic events, distress associated with these events, life stressors, difficulty associated with life stressors, gender, and social adjustment contribute to variance in posttraumatic growth.



## **CHAPTER 3**

### **Associations among posttraumatic growth, resilience, and distress in a sample of individuals coping well after the Canterbury earthquake sequence of 2010 and 2011.**

#### **Study 1**

### **3.1 Method**

#### **3.1.1 Participants**

Participants were Canterbury residents who were coping well, despite having been exposed to earthquake-related events such as witnessing falling buildings or seeing bodies, death of a loved one, physical injury or illness, income loss, property loss, or problems with housing caused by earthquake-related events. Participants were 18–71 years old, of either gender. Exclusion criteria included developing psychiatric illness as a result of the earthquake sequence and having had treatment for earthquake-related trauma.

Participants were recruited by reading about the study in articles, opinion pieces, and community notices in local Christchurch newspapers such as *The Press* (Appendix A). Recruitment also included flyers (Appendix B) placed in community centres and libraries and on community websites. Some participants heard about the study by word of mouth. Potential participants called a contact number or emailed an email address for the study. In the case of email contacts, researchers responded by contacting individuals by telephone. This first phone call allowed individuals to register their interest and gain more information about the study, and the researcher to screen them for suitability for the study.

#### **3.1.2 Procedure**

Potential participants were screened by telephone to determine that they had been exposed to earthquake-related events, and that they were coping well. Screening involved asking individuals about their experiences in the earthquakes, prompting for information regarding possible injury to self or others; death of a friend, family, or associate; impacts on work, finances, home, land, school, or transport; and any other issues. Screening aimed to ensure that potential participants had been moderately to severely affected by earthquake events. The severity of earthquake-related events was reviewed with senior members of the research team and consensus was reached about earthquake-related exposure. Efforts were made to include

individuals with comparable or greater earthquake exposure than a comparison group of individuals who were receiving treatment for earthquake-related posttraumatic stress disorder. Screening included enquiring how the caller deemed they were coping and asking specifically about whether the caller had experienced or was experiencing each possible symptom of posttraumatic stress, such as nightmares, flashbacks, or hyperarousal. Additionally, participants were asked about past or current psychiatric diagnoses or suicidality, and whether they were undergoing (or had undergone) treatment for earthquake-related distress. Individuals meeting criteria for posttraumatic stress disorder or any other psychiatric disorders developed in response to the earthquakes were excluded from the study and given information regarding treatment available to them. Individuals who were not exposed to a great deal of earthquake-related events were also excluded from the study. In all, 35 potential participants were excluded after screening, because of several factors: not having enough exposure to earthquake-related events; meeting criteria for a psychiatric disorder as a result of earthquake trauma; having had psychological treatment for earthquake trauma; changes in personal circumstances that made attending an assessment difficult. Six potential participants were excluded after assessment, because they met criteria for a psychiatric disorder as a result of earthquake trauma, as assessed by the Mini International Neuropsychiatric Interview (MINI; Sheehan et al, 1997), described in more detail in the assessment section of this study.

Interested and eligible participants attended an assessment, at which time they were given full information about the study and gave written informed consent. The information sheet and consent form are included as Appendices C and D, respectively. Participants then completed questionnaires and a semi-structured interview. Participants also completed neuropsychological tests for memory and recognition of facial emotions and neurobiological testing (not included in the current thesis). Anonymity of participants was preserved through the use of participant identification numbers to label questionnaires, transcripts, and audiotapes.

Assessments were conducted 2–3 years after the September 2010 and February 2011 earthquakes. Assessments were completed over the course of 13 months, from January 2013 to February 2014. Aftershocks continued after each major earthquake: as of September 4th 2014, over 14,000 aftershocks had occurred. Notable aftershocks occurred on September 8th

2010 (M5.1), October 19th 2010 (M5.0), December 26th 2010 (a number of shallow aftershocks, which incurred further damage to the city), and January 20th 2011 (M5.1) (Morton, 2015). Further major earthquakes also occurred on June 13th 2011 (M6.3) and on December 23rd 2011 (M5.8). In addition to continuing aftershocks, difficulties with housing and bureaucracy continued years after the initial earthquakes, meaning that participants were commonly still experiencing some difficulties associated with the earthquakes when they were assessed. This is important to note because, in the current studies, posttraumatic growth is assessed in circumstances of ongoing difficulty and distress, rather than 2 years after a discrete trauma.

## **3.2 Assessment**

Participants were assessed for the presence of psychiatric disorders using the MINI. Participants then completed a battery of 16 self-report measures. Measures pertinent to the current study assessed exposure to earthquake-related disruptions (Traumatic Exposure Severity Scale, TESS; Elal & Slade, 2005), peritraumatic distress (Peritraumatic Distress Inventory), social functioning (Social Adjustment Scale), psychological resilience (Connor-Davidson Resilience Scale, CD-RISC; Connor & Davidson, 2003), and posttraumatic growth (Posttraumatic Growth Inventory) and are described below. Copies of the questionnaires are provided in Appendix E, where copyright allows. Demographic information on age, gender, education, and ethnicity was also collected.

### **3.2.1 Psychiatric status**

The MINI (QSR International, 2014; Sheehan et al, 1997) assessed the presence of psychiatric disorders. The MINI is a structured diagnostic interview for psychiatric disorders, developed by clinicians and psychiatrists in the USA and Europe, based on DSM-IV and International Statistical Classification of Diseases and Related Health Problems (ICD)-10 diagnostic criteria. It is designed for clinical trials and epidemiological studies, and has good validity and reliability. The MINI corresponds to diagnoses made by the gold standard Structured Clinical Interview for DSM Diagnoses, with values for Cohen's kappa in the good to very good ranges, from .51 to .90, excepting an acceptable value of .43 for current drug dependence. Inter-rater reliability has been found to be excellent, with Cohen's kappa above

.75 for every diagnosis. Test–retest reliability is also very good overall, with kappa of above .75 for 14 of 23 diagnoses, and only one kappa below .40, for the diagnosis of current mania (Sheehan et al., 1997).

### **3.2.2 *Severity of trauma exposure***

The Traumatic Exposure Severity Scale (Elal & Slade, 2005) is a 24-item self-report scale developed to measure potentially traumatic events and distress in response to earthquakes. It is in two parts. The first part measures occurrence of a range of potentially traumatic events or experiences. Types of trauma assessed fall under five subscales: Resource Loss/Being in Need, Damage to Home and Goods, Personal Harm, Concern for Significant Others, and Exposure to the Grotesque. The second part measures distress associated with these experiences on a 5-point Likert-type scale, with 1 indicating no distress at all and 5 indicating extreme distress. The Traumatic Exposure Severity Scale thus gives an occurrence score and a distress score: for each item endorsed by the respondent, a score of 1 is given; the distress associated with each item is summed to give an overall distress score.

The Traumatic Exposure Severity Scale has good reliability, with Cronbach's alpha ranging from .64 to .84, and moderate correlations with other measures of traumatic distress, such as the Peritraumatic Distress Inventory (Elal & Slade, 2005), indicating good concurrent validity. No cut-off scores are specified to indicate severity of traumatic exposure.

### **3.2.3 *Level of peritraumatic distress***

The Peritraumatic Distress Inventory (Brunet et al., 2001) is a 13-item self-report measure using a 5-point Likert-type scale to assess the level of distress during and immediately after a potentially traumatic event. Focusing particularly on the experience of distress in response to an event, items tap two factors: the first is negative feelings; the second is perceived life threat and bodily arousal. Items enquire about feelings of helplessness; sadness; frustration; fear for one's own safety; guilt and shame; worry; lack of emotional control; difficulties controlling bodily functions; horror; shaking, sweating, or pounding heart; feeling faint; and having thoughts that one might die. Factor analysis found two factors in the scale: a) negative emotions and b) physiological arousal and perceived threat. Scores range from 0 to 13, with higher scores indicating more intense distress. The Peritraumatic Distress Inventory is internally consistent and has good convergent validity, correlating with the Peritraumatic

Dissociative Experiences Questionnaire ( $r = .59, p < .001$ ) and with subscales of the Impact of Event Scale - Revised: Intrusion ( $r = .47, p < .001$ ), Avoidance ( $r = .47, p < .001$ ), and Hyperarousal ( $r = .42, p < .001$ ). Discriminant validity is also good, with either modest correlations or no correlations with unrelated measures such as Sources of Support ( $r = -.11, p < .05$ ) and the Short Form Health Survey for Physical Health ( $r = -.15, p < .05$ ) (Brunet et al., 2001).

There are two ways of scoring the Peritraumatic Distress Inventory: using the mean of all 13 items, or using the sum of all item scores. The current study uses the mean of all items. One study proposed a cut off of 23 for the sum of all items, which predicted likelihood of developing posttraumatic stress disorder 1 month later (Guardia et al., 2013). As the current study uses the mean of all 13 items instead of the full sum, the comparable cut off for the current study corresponds to a score of 1.77.

### **3.2.4 Social adjustment**

The Social Adjustment Scale Self-Report (SAS S-R; Weissman, John, & Sholomskas, 1981) is a 45-item self-report measure assessing emotional and instrumental performance in a range of social roles. Questions focus on the 2 weeks prior to assessment and are separated into 11 subscales: occupational role; work at home; social and leisure activities; relationship with extended family, relationship with partner, relationship with children, and relationship with nuclear family; feelings of satisfaction in roles; friction in relationships; reported performance in each role; and interpersonal behaviours (such as disclosure to others and making effort to spend time with others). Some items are reverse-scored. Examples of items include: 'Have you been finding your work interesting?', 'Have you been doing the household tasks well?', 'Have you been able to talk openly about your feelings with your friends?', 'Have you got angry or argued with any of your relatives?', 'Have you and your partner shared the responsibility for practical matters that have arisen?', 'Have you been feeling that you have let your immediate family down at any time?'. Respondents answer using a 5-point Likert-type scale, from 'not at all' to 'all the time'. Lower scores indicate better social adjustment. The scale demonstrates good internal consistency (Cronbach's  $\alpha = .74$ ) and test-retest reliability ( $r = .80$ ) and discriminates between patient and non-patient populations, with patient groups scoring more highly, indicating poorer social adjustment (Weissman et al., 1981).

### **3.2.5 Resilience**

The Connor-Davidson Resilience Scale (Connor & Davidson, 2003) is a 25-item self-report scale. Connor and Davidson developed scale items based on research that identified characteristics of individuals exhibiting resilience. Examples of such characteristics were: commitment, viewing change as a challenge, strong self-confidence, adaptability to change, stress having a strengthening effect, social problem-solving skills, sense of humour in the face of adversity, patience, ability to withstand stress or pain, responding to tasks using action, having a realistic sense of control and recognising the limits to one's control, and developing goals (Kobasa, 1979; Lyons, 1991; Rutter, 1985). Examples of items include: 'I am able to adapt when changes occur', 'Having to cope with stress can make me stronger', and 'I have a strong sense of purpose in life'. Respondents rate each item on the 5-point Likert-type scale, from 1 = 'not true at all' to 5 = 'true nearly all of the time'. Higher scores indicate greater resilience. The scale has been used widely with community and clinical samples and shows good internal consistency (Cronbach's  $\alpha = .89$ ), good test-retest reliability ( $r = .87$ ), and good convergent validity, correlating strongly with the Kobasa Hardiness Measure ( $r = .83$ ).

### **3.2.6 Posttraumatic growth**

The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) is a 21-item scale developed to measure aspects of positive psychological consequences after potentially traumatic or stressful experiences. It has been used to measure growth after a wide range of potentially traumatic events, including motor vehicle accidents, assault, terrorism, and natural disasters including earthquakes. Domains of growth measured by subscales include: Relating to Others (7 items), New Possibilities (5 items), Personal Strength (4 items), Spiritual Change (2 items), and Appreciation of Life (3 items). Examples of items include 'I know better that I can handle difficulties', 'I have more compassion for others', 'I have developed new interests', and 'I can better appreciate each day'. Respondents use a 6-point Likert-type scale to indicate their endorsement of each item, from 0 = 'not at all' to 5 = 'to a very great degree'. The Posttraumatic Growth Inventory has good internal consistency (Cronbach's  $\alpha = .90$ ), acceptable test-retest reliability ( $r = .71$ ), and its face validity is supported by evidence that Posttraumatic Growth Inventory responses tend to be corroborated ( $r = .69$ ) by

others close to the person reporting growth (Tedeschi & Calhoun, 1996). There are no cut offs specified for the Posttraumatic Growth Inventory by the creators of the scale.

### **3.2.7 Stressful life events**

The Crisis in Family Systems Scale (CRISYS; Shalowitz, Berry, Rasinski, & Dannhausen-Brun, 1998) is a 63-item self-report scale, measuring the number of life events experienced in the 6 months prior to assessment and the difficulty perceived from experiencing each of these events. For the purposes of the current study, participants were also asked whether they had experienced these stressful life events during the last 5 years. Domains of stressful events include: financial events, legal events, career events, relationship events, medical events pertaining to self, medical events pertaining to others, safety in the community, safety at home, home issues, difficulty with authority, and prejudice. The scale shows good face and construct validity, and good test–retest reliability ( $r$  values ranged from .53 to .94), excepting distress ratings, which showed poor test–retest reliability. Shalowitz et al. (1998) posit that this may be because of the 7-point Likert-type scale they used, which made deciding on a level of distress difficult for participants. In the current study, a 5-point Likert-type scale is used to measure distress outcomes.

## **3.3 Data analyses**

Questionnaire data were entered into the database Progeny and double-checked for accuracy in data entry. Following data input, a 10% accuracy check and inspection of the score range for each variable were performed to confirm the precision of the data file. Where data were missing, that participant was excluded from the relevant analysis. Data were extracted from the database and analysed using the software Statistical Package for Social Sciences, version 21 (SPSS Software, 2014).

All data were examined for normality. For each measure, scatter plots were generated and examined, and  $z$  scores for skewness and kurtosis were calculated. Given the size of the sample,  $z$  scores over 3.29 for skewness or kurtosis indicated a non-normal distribution at the significance level of  $p < .01$ . Where distribution was non-normal and analyses required normal distribution, measures were transformed using log or square root transformations to render distribution normal. Alternatively, non-parametric statistics were used in analyses.

Hypotheses were tested in the following ways.

*Hypothesis 1: Posttraumatic growth will show a negative association with resilience, such that higher resilience will relate to lower levels of posttraumatic growth.*

Pearson's correlation was used to test the association of scores on the Posttraumatic Growth Inventory and scores on the Connor-Davidson Resilience Scale.

*Hypothesis 2: Moderate levels of stress will be associated with more posttraumatic growth than low or high levels of distress*

Hierarchical regression analysis was used to test for linear and curvilinear associations between posttraumatic growth and different measures of distress during the earthquakes, during and since the earthquakes, and as a result of stressful life events in the 5 years prior to assessment. In order to test for the possibility of a curvilinear association between each distress measure and posttraumatic growth, for each distress measure, a hierarchical regression was conducted, with Posttraumatic Growth Inventory scores as the dependent variable. A new predictor variable was created to test for a curvilinear association by mean-centring and squaring distress scores (Cohen, Cohen, West, & Aiken, 2013). The original distress score was entered in Step 1 of a hierarchical regression, and the squared distress score was entered in Step 2 of the regression. The linear regression and curvilinear regression were compared to ascertain goodness of fit for each regression model. This examined whether the data for each measure of distress showed a curvilinear association with posttraumatic growth, such that those reporting moderate levels of stress showed more posttraumatic growth than those reporting low or high levels of stress. In addition to curvilinear regression, another method for testing for a curvilinear association was used. The data were split into tertiles according to level of peritraumatic distress, split according to percentiles with cut points at 33.3% and 66.6%. The tertiles were entered into a general linear model to test for significant differences between them on score on the Posttraumatic Growth Inventory. Tukey post-hoc analysis was used to identify where tertiles differed significantly from other tertiles.

*Hypothesis 3: Objective severity of threat exposure will relate positively to posttraumatic growth.*

Pearson's correlation was used to test the association between the number of potentially traumatic events experienced during the earthquakes and the level of posttraumatic growth.



The number of earthquake-related traumatic events experienced was measured by the Traumatic Exposure Severity Scale: Occurrence subscale.

*Hypothesis 4: Posttraumatic growth will be positively correlated with the Social Adjustment Scale subscales of Interpersonal Behaviour and Feelings of Satisfaction.*

For this hypothesis, subscales of particular interest were Interpersonal Behaviour, and Feelings and Satisfaction. Pearson's correlation coefficients were calculated between measures of posttraumatic growth and these subscales.

*Hypothesis 5: Gender and age will interact, such that age will not influence posttraumatic growth in men, but older women will show higher levels of posttraumatic growth.*

A general linear model was used to test for an Age  $\times$  Gender interaction to ascertain whether older women showed more posttraumatic growth than younger women, and whether age related to posttraumatic growth in men.

*Hypothesis 6: Women will score more highly on the Posttraumatic Growth Inventory, particularly on the subscales of Relating to Others, New Possibilities, Personal Strength, and Spiritual Change.*

The scores of males and females on the normally distributed subscales were compared using *t* tests. The Mann–Whitney *U* test was used to compare males' and females' scores on the Spiritual Change subscale, which was not normally distributed.

*Hypothesis 7: Women will report more distress in response to the earthquakes and life stressors; this will relate to higher posttraumatic growth. Curvilinear associations between distress measures and posttraumatic growth will be stronger than linear associations.*

As women were expected to show greater posttraumatic growth, and distress was hypothesised to relate to posttraumatic growth, women were hypothesised to report greater distress than men during the earthquakes, since the earthquakes, and in relation to more general life stressors measured by the Crisis in Family Systems Scale. This hypothesis was examined using *t* tests for each scale indicating distress. Measures of distress were examined separately and included: Peritraumatic Distress Inventory total score; Traumatic Exposure Severity Scale total distress score; and the Crisis in Family Systems Scale score indicating level of difficulty with life stressors.

Where results indicated that gender influences levels of distress reported, possible mediation effects were examined. Bivariate correlations were calculated to confirm associations between gender and distress, gender and growth, and distress and growth. Hierarchical regression was then used to examine the associations among gender, distress measures, and growth. Gender was entered at Step 1, and the measure of distress entered at Step 2. Where distress reduced the strength of the association between gender and growth, the Sobel test was used to ascertain the significance of the mediating effect.

To test for curvilinear associations of distress and posttraumatic growth, the data file was split according to gender, and distress variables were mean-centred. A new predictor variable was created to test for a curvilinear relationship by squaring the mean-centred distress scores (Cohen et al., 2003). The original distress scores for women and men were entered at Step 1 of a hierarchical regression, and the squared distress scores for women and men were entered at Step 2 of the regression. The linear and curvilinear regression models were compared to ascertain goodness of fit for each regression model. This examined whether the data for men and women for each measure of distress showed a curvilinear association with posttraumatic growth, such that women reporting moderate levels of stress showed more posttraumatic growth than those reporting low or high levels of stress.

### ***Exploratory questions***

*1. Whether the number of life stressors in the 5 years and 6 months prior to assessment relate to levels of posttraumatic growth.*

To explore the possible associations between posttraumatic growth and the number of stressful life events in the 6 months prior to assessment and in the 5 years prior to assessment, Pearson's correlation coefficients were calculated. Correlation coefficients were also calculated to examine the association between difficulty of life stressors and posttraumatic growth. Where variables were not normally distributed, they were either transformed to fit the data to a normal distribution, or where data were not able to be rendered normal, non-parametric Spearman's rank correlation coefficients were calculated.

*2. Whether posttraumatic growth relates to education.*

A one-way between-groups analysis of variance was calculated to explore the impact of level of education on posttraumatic growth.

*3. Whether peritraumatic distress, number of earthquake-related traumatic events, distress associated with these events, life stressors, difficulty associated with life stressors, gender, and social adjustment contribute to variance in posttraumatic growth.*

A series of linear regression models was calculated to examine the relative contribution of key variables (peritraumatic distress, number of earthquake-related traumatic events, distress associated with these events, life stressors, difficulty associated with life stressors, gender, and social adjustment) to the total score on the Posttraumatic Growth Inventory, to give the best model of independent variables contributing to posttraumatic growth. In the first phase of the analyses, associations between the following candidate predictor variables were examined using univariate analyses: gender; age; level of peritraumatic distress; level of traumatic exposure severity; distress as a result of traumatic exposure; social adjustment; number and difficulty of life stressors in the 5 years prior to assessment and 6 months prior to assessment; and level of education. Variables showing some degree of association ( $p < .1$ ) were entered into a hierarchical regression model to determine the independent effect of these variables on posttraumatic growth.

### **3.4 Results**

The sample comprised 101 residents of Canterbury, ranging from 18 to 72 years old. Demographic characteristics of the sample are presented in Table 1. The mean age of the sample was 50.1 years, ( $SD = 11.02$  years) and the sample comprised 34 males and 67 females. Median education level was a university degree (bachelor's degree or diploma). Seventy-nine participants were of New Zealand European descent, with one participant of Māori descent, one of Cook Island Māori descent, one Indian, and others from German, Chinese, Irish, Celtic, and other European descent.

#### **3.4.1 Normality testing**

Scatter plots and histograms were generated for each scale and subscale and examined visually for normality. Measures of skewness and kurtosis,  $z$  scores, and standard errors were calculated giving an indication of the normality of each measure, as recommended by Ghasemi and Zahediasl (2012). For the current sample size ( $n < 200$ ) and at the significance level of  $p < .05$ , a  $z$  score of greater than 1.96 or less than  $-1.96$  for skewness or kurtosis indicates a non-normal distribution of the scale. Table 2 outlines  $z$  scores, with corresponding classification of normality or non-normality. Normal distributions were found for the total score on the Posttraumatic Growth Inventory and the subscales of the Posttraumatic Growth Inventory, with the exception of the Spiritual Change subscale. Normal distributions were found for age and scores on the Peritraumatic Distress Inventory; the Connor-Davidson Resilience Scale; the Traumatic Exposure Severity: Total Occurrence of Distressing Events subscale; the Social Adjustment Scale (total score); and the Crisis in Family Systems Scale: Difficulty of Life Events subscale. Where scales were not distributed normally, they were transformed using a square root transformation. New data for transformed variables are included below the data for the original variable in Table 2.

Table 1

*Gender, age, education, and ethnicity of 101 Canterbury residents coping well after moderate to high exposure to earthquake-related events*

<b>Variable</b>	<b>Description of variable</b>	<b>Frequency</b>	<b>Percentage of sample</b>
<b>Gender</b>	Male	34	33.7
	Female	67	66.3
<b>Age</b>	18 to 29	6	5.9
	30 to 39	9	8.9
	40 to 49	30	29.7
	50 to 59	33	32.7
	60 to 69	21	20.8
	70+	2	2.0
<b>Education</b>	1 to 4 years high school	7	6.9
	5 to 6 years high school	8	7.9
	Trade or technical certificate	9	8.9
	Bachelor's degree / diploma	45	44.6
	Postgraduate degree	32	31.7
<b>Ethnicity</b>	New Zealand European	79	78.2
	Māori	1	1.0
	Cook Island Māori	1	1.0
	Indian	1	1.0
	Other	19	18.8

Table 2

*Skewness and kurtosis (z scores) for measures of posttraumatic growth, peritraumatic distress, resilience, traumatic exposure severity, social adjustment, stressful life events, age, and education, indicating normality of distributions*

Measure	Skewness (SE)	z score skewness	Kurtosis (SE)	z score kurtosis	Normal / non-normal distribution
<b>Posttraumatic Growth Inventory total score</b>	0.44 (0.24)	1.86	−0.43 (0.48)	0.89	Normal
<i>Subscales</i>					
<i>Appreciation of Life</i>	0.05 (0.24)	0.23	−1.02 (0.48)	2.14	Normal
<i>New Possibilities</i>	0.47 (0.24)	1.97	−0.92 (0.48)	1.93	Normal
<i>Personal Strength</i>	−0.07 (0.24)	0.30	−.98 (0.48)	2.05	Normal
<i>Relating to Others</i>	0.33 (0.24)	1.38	7.75 (0.61)	−1.39	Normal
<i>Spiritual Change</i>	1.85 (0.24)	7.70	2.89 (0.48)	6.06	Non-normal
<b>Peritraumatic Distress Inventory</b>	0.58 (0.24)	2.38	−0.35 (0.48)	0.75	Normal
<b>Connor-Davidson Resilience Scale</b>	−0.43 (0.24)	1.78	0.53 (0.48)	1.10	Normal

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<b>Traumatic Exposure</b>					
<b>Severity Scale</b>					
<i>Subscales</i>					
<i>Total Occurrence</i>	0.31 (0.24)	1.28	−0.19 (0.48)	0.39	Normal
<i>Total Distress</i>	1.11 (0.24)	4.56	2.44 (0.05)	5.05	Non-normal
<i>Square root transformed subscale: Total Distress</i>	0.16 (0.25)	0.64	−0.15 (0.49)	−0.31	Normal
<b>Social Adjustment Scale total</b>	0.70 (0.24)	2.90	0.38 (0.48)	0.79	Normal
<i>Subscales</i>					
<i>Work Outside Home</i>	1.21 (0.26)	4.60	1.89 (0.52)	3.65	Non-normal
<i>Housework</i>	1.29 (0.24)	5.37	2.65 (0.48)	5.57	Non-normal
<i>Social and Leisure Activities</i>	0.42 (0.24)	1.75	0.12 (0.48)	0.24	Normal
<i>Extended Family</i>	0.09 (0.24)	0.36	0.26 (0.48)	0.54	Normal

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<i>Relationships</i>					
<i>Marital Relationships</i>	0.95 (0.28)	3.36	0.45 (0.56)	0.81	Non-normal
<i>Parental Relationships</i>	1.16 (0.32)	3.61	1.18 (0.63)	1.86	Non-normal
<i>Family Relationships</i>	1.65 (0.27)	6.10	1.86 (0.54)	3.49	Non-normal
<i>Interpersonal Behaviour</i>	0.38 (0.24)	1.59	0.46 (0.48)	0.97	Normal
<i>Performance</i>	0.36 (0.24)	1.50	0.21 (0.48)	0.45	Normal
<i>Feelings of Satisfaction</i>	1.09 (0.24)	4.50	0.99 (0.48)	0.00	Non-normal
<i>Friction</i>	1.72 (0.24)	7.17	4.64 (0.48)	9.74	Non-normal
<b>Life events (Crisis in Family Systems Scale)</b>					
<i>Events in Past 6 Months</i>	1.18 (0.24)	4.89	1.40 (0.48)	2.92	Non-normal
<i>Events in Past 5 Years</i>	1.23 (0.24)	5.10	2.05 (0.48)	4.30	Non-normal
<i>Square root transformation of Events in Past 5 Years</i>	0.36 (0.24)	1.49	0.25 (0.48)	0.53	Normal

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<i>Mean difficulty of events</i>	0.42 (0.24)	1.75	−0.30 (0.48)	−0.62	Normal
<b>Age</b>	−0.49 (0.24)	2.05	0.16 (0.48)	0.33	Normal
<b>Education</b>					
<i>1–4 years high school</i>	−0.44 (0.79)	−0.55	−0.26 (1.59)	0.16	Normal
<i>5–6 years high school</i>	0.43 (0.75)	0.57	−1.58 (1.48)	1.07	Normal
<i>Trade or technical certificate</i>	0.10 (0.72)	1.39	−0.14 (1.40)	0.10	Normal
<i>Bachelor's degree or diploma</i>	0.57 (0.35)	1.63	−0.34 (0.70)	0.49	Normal
<i>Postgraduate diploma</i>	0.10 (0.42)	0.25	−0.44 (0.82)	0.53	Normal

### ***3.4.2 Levels of posttraumatic growth, peritraumatic distress, resilience, social adjustment, life events, and traumatic severity of earthquake experiences***

Means and standard deviations for scores on the Posttraumatic Growth Inventory, the Connor-Davidson Resilience Scale, the Traumatic Exposure Severity Scale, the Peritraumatic Distress Scale, the Social Adjustment Scale, and the Crisis in Family Systems Scale are reported in Table 3.

Participants reported mean levels of overall posttraumatic growth of 37.44 ( $SD = 22.58$ ), ranging from 0 to 93, out of a maximum possible score of 105. The highest subscale score was Relating to Others ( $M = 12.99$ ,  $SD = 8.40$ ), followed by Personal Strength ( $M = 8.64$ ,  $SD = 4.21$ ) and New Possibilities ( $M = 7.75$ ,  $SD = 6.08$ ). Appreciation of Life was also reported ( $M = 6.34$ ,  $SD = 3.78$ ) and, to a lesser extent, Spiritual Change ( $M = 1.60$ ,  $SD = 2.56$ ). Although subscales cannot be compared directly because of the differing numbers of items in each, it is possible to divide mean subscale scores by the total possible score on each subscale, and compare the percentage endorsement of each subscale. Calculations yield averages of 37% endorsement for Relating to Others, 31% for New Possibilities, 43% for Personal Strength, 16% for Spiritual Change, and 42% for Appreciation of Life. This rudimentary calculation indicates similar endorsement of the subscales of the Posttraumatic Growth Inventory, excepting Spiritual Change, which was less frequently endorsed.

Table 3

*Means and standard deviations for posttraumatic growth, resilience, distress measures, social adjustment, and stressful life events*

<b>Scale or subscale</b>	<b><i>M</i></b>	<b><i>SD</i></b>
<b>Posttraumatic Growth Inventory total score</b>	37.44	22.58
<b><i>Subscales</i></b>		
<i>Relating to Others</i>	12.99	8.40
<i>New Possibilities</i>	7.75	6.08
<i>Personal Strength</i>	8.65	5.21
<i>Spiritual Change</i>	1.60	2.56
<i>Appreciation of Life</i>	6.34	3.78
<b>Connor-Davidson Resilience Scale</b>	75.92	12.05
<b>Traumatic Exposure Severity Scale</b>		
<b><i>Subscales</i></b>		
<i>Occurrence (number of stressful elements of earthquake experiences)</i>	5.15	2.56
<i>Distress (distress related to stressful elements of earthquake experiences)</i>	15.42	10.80
<b>Peritraumatic Distress Inventory total score</b>	1.03	0.63
<b>Social Adjustment Scale</b>	1.63	0.29
<b><i>Subscales</i></b>		
<i>Work Role Adjustment</i>	1.36	0.29
<i>Home Role Adjustment</i>	1.53	0.40
<i>Social and Leisure Adjustment</i>	1.73	0.38
<i>Extended Family Adjustment</i>	1.75	0.35
<i>Marital Adjustment</i>	1.88	0.50
<i>Parental Adjustment</i>	1.44	0.44

<i>Family Adjustment</i>	1.22	0.35
<i>Performance Adjustment</i>	1.90	.41
<i>Feelings of Satisfaction with Relationships</i>	1.41	.29
<i>Friction in Relationships</i>	1.21	.24
<i>Interpersonal Adjustment</i>	2.07	.49
<b>Crisis in Family Systems Scale</b>		
<i>Subscales</i>		
<i>Life events in Past 5 years</i>	8.47	4.90
<i>Life events in Past 6 months</i>	3.56	2.81
<i>Difficulty with Life Events in Past 5 years</i>	2.05	.69

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### 3.4.3 Resilience

Resilience scores in the sample were normally distributed, with a mean score of 75.9 ( $SD = 12.0$ ) of a possible 100, similar to the norm for the US general population during scale development ( $M = 80.7$ ,  $SD = 12.8$ ) (a population randomly sampled and thus not necessarily exposed to trauma). This compares to scores taken from primary care patients ( $M = 71.8$ ), psychiatric outpatients ( $M = 68$ ), individuals with generalised anxiety disorder ( $M = 62.4$ ) and two samples of individuals with posttraumatic stress disorder ( $M = 47.8$  and  $52.8$ ; Connor & Davidson, 2003). The mean resilience score for the sample in the current study is similar to that of community samples in many studies in samples from studies in the USA (ranging from  $M = 75.7$  ( $SD = 13.0$ ) to  $M = 83.0$  ( $SD = 13.4$ )) and Australia (ranging from  $M = 71.3$  ( $SD = 10.8$ ) to  $M = 73.4$  ( $SD = 13.6$ )). Non-treatment-seeking trauma survivors in studies in Canada and the USA showed scores on the same resilience scale ranging from  $M = 68.9$  ( $SD = 15.3$ ) to  $M = 83.4$  ( $SD = 9.9$ ; Connor & Davidson, 2015). The sample might thus be assumed to be as resilient as the general population in culturally similar countries such as Australia, and as resilient as non-treatment-seeking trauma survivors. Where resilience is defined as undergoing earthquake events and not developing psychiatric disorders in response, the sample for the current thesis meets the criteria for definition, and can be considered resilient.

**3.4.4 Hypothesis 1: Posttraumatic growth will show a negative association with resilience, such that higher resilience will relate to lower levels of posttraumatic growth**

No significant correlation was found between scores on the Connor-Davidson Resilience Scale and scores on the Posttraumatic Growth Inventory,  $r = .10$ ,  $n = 99$ ,  $p = .35$ . Hypothesis 1 was rejected: posttraumatic growth was not directly related to resilience.

**3.4.5 Hypothesis 2: Moderate levels of distress will be associated with more posttraumatic growth than low or high levels of distress**

A linear association was found between the level of distress experienced during the earthquakes (as measured by the Peritraumatic Distress Inventory) and posttraumatic growth (as measured by the Posttraumatic Growth Inventory). Greater distress predicted higher levels of reported posttraumatic growth. Peritraumatic distress explained 21% of the variance in posttraumatic growth,  $F(1, 92) = 23.82$ ,  $p < .001$ ;  $\beta = .17$ ,  $p < .001$ . Curvilinear regression was associated with no significant improvement in model fit from the linear model,  $R^2 = .00$ ,  $F(1, 91) = .02$ ,  $p = .90$ , indicating that, contrary to Hypothesis 1, there was no significant decline in posttraumatic growth in participants experiencing higher levels of distress during the earthquakes, and instead showing that as distress levels increased, so did posttraumatic growth. For the second method for testing for a curvilinear association, the data were split into tertiles according to level of peritraumatic distress, split according to percentiles with cut points at 33.3% and 66.6%. Tertile 1 included scores on the Peritraumatic Distress Inventory from 0 to .69, Tertile 2 included scores from .69 to 1.38, and Tertile 3 included scores from 1.39 to 2.69. The first tertile ( $M = 28.15$ ) was not significantly different from the second tertile ( $M = 36.83$ ); however, the third tertile ( $M = 51.21$ ) showed significantly higher posttraumatic growth than the first two tertiles,  $F(2, 96) = 10.27$ ,  $p < .001$ . Results did not indicate a curvilinear association between posttraumatic growth and peritraumatic distress but did suggest that a score over 1.39 on the Peritraumatic Growth Inventory was more strongly related with higher posttraumatic growth.

Because the data from the Traumatic Exposure Severity Scale: Distress subscale was non-normally distributed and had already undergone a square root transformation, it

was not possible to produce a hierarchical model that examined the possible curvilinear nature of the association of distress with posttraumatic growth.

There was a significant positive correlation between the two variables of medium magnitude,  $r = .44$ ,  $n = 100$ ,  $p < .001$ , with higher levels of posttraumatic growth associated with higher reported distress during and since the earthquakes.

A linear association was found between difficulty with life events and posttraumatic growth, such that greater difficulty predicted higher levels of reported posttraumatic growth. Difficulty explained 20% of the variance in post-traumatic growth,  $F(1, 98) = 24.91$ ,  $p < .001$ ;  $\beta = .45$ ,  $p < .001$ . The curvilinear regression showed no significant improvement in model fit from the linear model,  $R^2 = .02$ ,  $F(1, 97) = 2.68$ ,  $p = .11$ , indicating that as difficulty with life events increased, so did posttraumatic growth. For the additional method for testing for a curvilinear association, the data were split into tertiles. Tertile 1 included scores on the Crisis in Family Systems Scale: Difficulty with Life Events subscale from 0.8 to 1.6, Tertile 2 included scores from 1.6 to 2.3, and Tertile 3 included scores from 2.3 to 4.0. The first tertile ( $M = 30.1$ ) was not significantly different to the second tertile ( $M = 31.3$ ); however, the third tertile ( $M = 51.1$ ) showed significantly higher posttraumatic growth than the first two tertiles,  $F(2, 97) = 10.87$ ,  $p < .001$ . Results did not indicate a curvilinear association between posttraumatic growth and difficulty with life events but did suggest that a score over 2.31 on the Crisis in Family Systems Scale: Difficulty with Life Events subscale was more strongly related with higher posttraumatic growth. Hypothesis 2 was therefore rejected: moderate levels of distress did not associate with more posttraumatic growth than low or high levels of distress.

#### ***3.4.6 Hypothesis 3: Objective severity of threat exposure will relate positively to posttraumatic growth***

A significant positive correlation was found, of medium magnitude ( $r = .33$ ,  $p < .01$ ), between the number of earthquake-related traumatic events experienced and the level of posttraumatic growth. This indicated that a higher number of traumatic events experienced by participants related to greater posttraumatic growth. These results supported Hypothesis 3, that a higher objective measure of exposure to traumatic events relates to a higher level of posttraumatic growth.

#### ***3.4.7 Hypothesis 4: Posttraumatic growth will be negatively correlated with Social Adjustment Scale subscales of Interpersonal Behaviour and Feelings of Satisfaction***

Pearson's correlation coefficients were calculated for the Posttraumatic Growth Inventory and normally distributed variables (Social Adjustment Scale total score, and Social Adjustment Scale: Interpersonal Behaviour subscale), and Spearman's rank correlation coefficients were calculated for the Posttraumatic Growth Inventory and Social Adjustment Scale: Feelings of Satisfaction subscale.

No significant correlations were found for overall Social Adjustment ( $r = .18$ ,  $p = .08$ ), or Interpersonal Behaviour ( $r = .9$ ,  $p = .37$ ). A statistically significant, although weak, positive correlation was found between Social Adjustment Scale: Feelings of Satisfaction subscale with relationships and the Posttraumatic Growth Inventory scores ( $r = .28$ ,  $p = .005$ ). Results did not support Hypothesis 4: only one of the Social Adjustment Scale subscales correlated significantly with posttraumatic growth, and this correlation was in the direction opposite to that hypothesised. Findings indicate that less satisfaction with social relationships relates to higher posttraumatic growth.

#### ***3.4.8 Hypothesis 5: Gender and age will interact, such that age will not influence posttraumatic growth in men, but older women will show higher levels of posttraumatic growth***

Age and gender were entered into a general linear model and an Age  $\times$  Gender interaction was tested to ascertain whether older women showed more posttraumatic growth than younger women, and whether age related to posttraumatic growth in men. No significant interaction was found between gender and age,  $F(1, 96) = .56$ ,  $p = .46$ . Hypothesis 5 was not supported: age did not interact with gender so that older women reported more posttraumatic growth.

#### ***3.4.9 Hypothesis 6: Women will score more highly on the Posttraumatic Growth Inventory, particularly on the subscales of Relating to Others, New Possibilities, Personal Strength, and Spiritual Change***

Men's and women's mean scores for normally distributed variables were compared using  $t$  tests: Posttraumatic Growth Inventory total score, Appreciation of Life, New Possibilities, Personal Strength, and Relating to Others. A Mann–Whitney  $U$  test was

used to explore any gender differences in reporting Spiritual Change, as this subscale did not have a normal distribution.

Females had higher Posttraumatic Growth Inventory scores than males,  $t(98) = -2.18$ ,  $p = .03$ . Additionally, females had higher scores on the Appreciation of Life subscale than males,  $t(99) = -2.00$ ,  $p = .05$ . Females had higher Relating to Others subscale scores after the earthquakes compared to males,  $t(98) = -2.16$ ,  $p = .03$ . Personal Strength subscale scores were also higher for women than for men,  $t(99) = -2.45$ ,  $p = .02$ . According to Cohen's (1988) guidelines for interpreting effect sizes,  $d = .20$  indicates a small effect,  $d = .50$  indicates a medium effect, and  $d = .80$  indicates a large effect. For all significant gender differences on the Posttraumatic Growth Inventory Scale and subscales, Cohen's  $d$  indicated effect sizes were close to medium.

No other significant gender differences were found in the New Possibilities and Spiritual Change subscales of the Posttraumatic Growth Inventory. Mean scale and subscale scores, standard deviations,  $t$  scores,  $p$  values for significance, and Cohen's  $d$  scores for effect sizes for males and females can be found in Table 4.

Hypothesis 6 was partially supported: women showed higher levels of posttraumatic growth than men, and on the subscales of Relating to Others and Personal Strength. However women also showed higher scores on Appreciation of Life, which does not support Hypothesis 6, and women did not show higher scores on Spiritual Change or New Possibilities, contrary to Hypothesis 6.



Table 4

*Comparison of total scale and subscale scores for the Posttraumatic Growth Inventory for males and females, and t scores, p values, and effect sizes for gender differences*

Scale or subscale	Male <i>M (SD)</i>	Female <i>M (SD)</i>	<i>t</i> score	<i>p</i> value	Cohen's <i>d</i> effect size
<b>Total</b>	30.55	40.84 (22.91)	-2.18	0.03	0.47
<b>posttraumatic growth score</b>	(20.51)				
<i>Subscales</i>					
<i>Appreciation of Life</i>	5.29 (3.59)	6.87 (3.79)	-2.00	0.05	0.43
<i>New Possibilities</i>	6.41 (5.69)	8.43 (6.20)	-1.59	0.12	
<i>Personal Strength</i>	6.91 (5.13)	9.54 (5.06)	-2.45	0.02	0.52
<i>Relating to Others</i>	10.45 (7.77)	14.24 (8.47)	-2.16	0.03	0.47
<i>Spiritual Change</i>	1.29 (2.30)	1.76 (2.69)	-0.87	0.39	

**3.4.10 Hypothesis 7: Women will report more distress in response to the earthquakes and life stressors; this will relate to higher posttraumatic growth. Curvilinear associations between distress measures and posttraumatic growth will be stronger than linear associations**

The hypothesis that women will have experienced more distress than men during or since the earthquakes was explored using *t* tests to compare gender on the Peritraumatic Distress Inventory score, the Traumatic Exposure Severity Scale: Distress subscale score (indicating distress during and since the earthquakes), and the

Traumatic Exposure Severity Scale: Occurrence subscale score (representing the number of traumatic events experienced during and since the earthquakes).

A significant difference was found between men and women in the level of distress reported during the earthquakes on the Peritraumatic Distress Inventory,  $t(98) = -2.07, p = .04$ . The mean score for males on the Peritraumatic Distress Inventory ( $M = .85$ ) was lower than that of females ( $M = 1.12$ ), indicating that men reported less distress during the earthquakes. The magnitude of the difference between the means ( $M_{\text{difference}} = -.27, 95\% \text{ CI } [-.53, -.01]$ ) was small to moderate ( $\eta^2 = -0.045$ ).

No significant difference was found between genders on distress related to the severity of trauma exposure,  $t(96) = -.73, p = .47$ . And there were no significant differences between genders on the occurrence of trauma exposure,  $t(99) = -.09, p = .93$ . This indicated that men and women in the sample reported comparable numbers of stressful events during and since the earthquakes, and comparable distress about earthquake-related events.

Data were examined for differences between men and women on the Crisis in Family Systems Scale subscales by calculating  $t$  tests. No differences were found between men and women in the number of stressful life events reported over the last 5 years,  $t(99) = .05, p = .96$ . However, women reported significantly more difficulty associated with the life events they reported ( $M = 2.17$ ) than did men ( $M = 1.84$ ),  $t(99) = -2.30, p < .05$ . The magnitude of the difference between the means ( $M = -.33, 95\% \text{ CI } [-.61, -.05]$ ) was small to moderate ( $\eta^2 = -0.05$ ).

#### *3.4.10.1 Testing for a mediation effect*

Given the associations between gender and distress (as measured by the Peritraumatic Distress Inventory), distress and posttraumatic growth, and gender and posttraumatic growth, a mediation analysis (hierarchical regression) was conducted to examine the possibility of distress during the earthquakes mediating the influence of gender on posttraumatic growth. Gender was entered at Step 1, explaining 5% of the variance in posttraumatic growth. After entry of the distress variable at Step 2, the total variance of posttraumatic growth explained by gender and distress was 20%,  $F(2, 96) = 11.97, p < .001$ . Distress explained an additional 16% of the variance in posttraumatic growth,  $R^2 = .16, F(1, 96) = 18.55, p < .001$ . The Sobel test was used to examine the

significance of the mediation effect, and it indicated that the mediation fell just short of the accepted significance level of  $p < .05$ , Sobel test statistic = 1.95,  $SE = 75.56$ ,  $p = .052$ . Taken together, these results suggest that it is possible that the association of gender to posttraumatic growth is mediated by peritraumatic distress; this possibility needs further research.

This mediation effect is illustrated below in Figure 2.

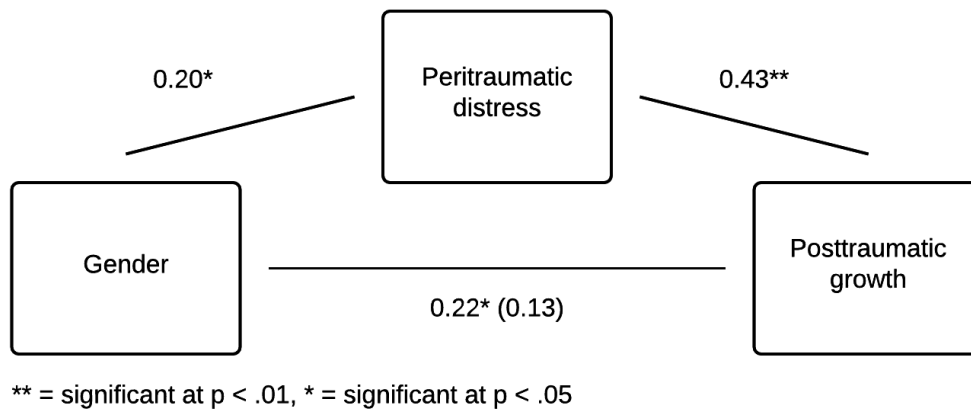


Figure 2: Mediating effect of peritraumatic distress on the association of gender and posttraumatic growth

A second hierarchical regression was used to ascertain whether the reported difficulty of life events in the last 5 years mediated the association between gender and posttraumatic growth. Gender was entered at Step 1, explaining 5% of the variance in posttraumatic growth. After entry of difficulty with life events at Step 2, the total variance of posttraumatic growth explained by gender and life event difficulty was 22%,  $F(2, 97) = 13.50$ ,  $p < .001$ . Life event difficulty explained an additional 17% of the variance in posttraumatic growth,  $R^2 = .17$ ,  $F(1, 97) = 21.25$ ,  $p < .001$ . The Sobel test indicated that the mediation was significant, Sobel test statistic = 1.97,  $SE = 72.14$ ,  $p = .049$ . The association of gender to posttraumatic growth was mediated by Difficulty with Life Events. The mediation is represented in Figure 3.

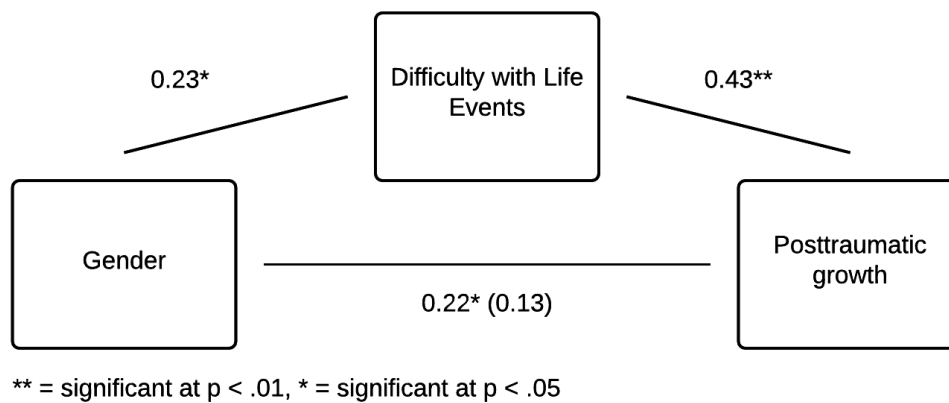


Figure 3: Mediating effect of Difficulty with Life Events on the association between gender and posttraumatic growth

Hypothesis 7 was partially supported: the association of gender and posttraumatic growth was mediated by Difficulty with Life Events. Further research is needed to replicate and explore how peritraumatic distress mediates the association of gender and posttraumatic growth.

#### 3.4.10.2 Testing for curvilinear associations of distress and posttraumatic growth in women

A linear relationship was found for women between the level of distress experienced during the earthquakes and posttraumatic growth, such that greater distress predicted higher levels of reported posttraumatic growth. Peritraumatic distress explained 22% of the variance in posttraumatic growth in women,  $F(1, 64) = 18.46, p < .001; \beta = .47, p < .001$ . Curvilinear regression was associated with no significant improvement in model fit from the linear model,  $R^2 = .00, F(1, 64) = .01, p = .43$ , indicating that, contrary to Hypothesis 7, there was no curvilinear association of peritraumatic distress to posttraumatic growth for women.

The process was repeated using the Crisis in Family Systems Scale: Difficulty with Life Events subscale scores, in order to explore the association of difficulty with life events and posttraumatic growth for women. A linear association was found for women between the level of difficulty with life events and posttraumatic growth, such that greater difficulty with life events predicted higher levels of reported posttraumatic growth. Difficulty with life events explained 18% of the variance in posttraumatic growth in women,  $F(1, 65) = 14.19, p < .001; \beta = .42, p < .001$ .

Curvilinear regression was associated with no significant improvement in model fit from the linear model,  $R^2 = .00$ ,  $F(1, 65) = .02$ ,  $p = .28$ , again indicating that, contrary to Hypothesis 7, there was no curvilinear association of difficulty with life events to posttraumatic growth for women.

In summary, women reported higher levels of posttraumatic growth than men, higher levels of peritraumatic distress than men, and higher levels of difficulty with life events in the past 5 years than men did. Women's higher levels of difficulty with life events accounted for some of women's higher reported posttraumatic growth; women's higher levels of peritraumatic distress also possibly accounted for some of women's higher reported posttraumatic growth. Contrary to Hypothesis 7, there were no curvilinear associations between peritraumatic distress and posttraumatic growth, or between difficulty with life events and posttraumatic growth.

### ***3.4.11 Examination of exploratory questions***

#### *3.4.11.1 Whether the number of life stressors in the 5 years and 6 months prior to assessment relate to levels of posttraumatic growth*

Stressful life events in the 5 years prior to assessment were measured with the Crisis in Family Systems Scale, which gave a score for the occurrence of stressful events and a score for the recalled difficulty of these events. Stressful events assessed were in the domains of finance, legal, career, relationships, illness of self or others, prejudice, safety, and difficulty with authority. It is likely that questions about a number of these domains (e.g., finance, career, medical events, safety of others) may have tapped into earthquake-related stressors as well as others events occurring in the 5 years prior to assessment.

Associations between life stressors and posttraumatic growth were explored using correlations between the Crisis in Family Systems Scale subscales and the Posttraumatic Growth Inventory. The Crisis in Family Systems Scale subscales indicate a) the number of stressful life events in the last 5 years, b) the number of stressful events in the last 6 months, and c) the mean level of difficulty an individual reports associated with stressful life events over the last 5 years. The subscale representing the number of stressful life events in the 6 months prior to assessment was not normally distributed, and transformations did not fit the data to a normal

distribution. The association between the subscale representing the number of stressful life events in the last 6 months and scores on the Posttraumatic Growth Inventory was therefore explored using Spearman's correlation. There was no significant correlation between the number of stressful events in the past 6 months and scores on the Posttraumatic Growth Inventory,  $r = .04$ ,  $n = 99$ ,  $p = .71$ .

The subscale indicating the number of stressful events in the 5 years prior to assessment was positively skewed and a square root transformation was used to fit these data to a normal distribution. The association between number of life events and posttraumatic growth was investigated using Pearson's correlation. The number of stressful events in the 5 years prior to assessment was not significantly correlated with posttraumatic growth,  $r = .17$ ,  $n = 100$ ,  $p = .09$ .

Testing this exploratory question showed that the number of stressful life events did not relate to posttraumatic growth.

#### *3.4.11.2 Whether posttraumatic growth relates to education*

Education was measured in five levels: 1–4 years high school, 5–6 years high school, trade or technical certificate, bachelor's degree or diploma, and postgraduate diploma. A one-way between-groups analysis of variance was used to examine the impact of level of education on posttraumatic growth, as measured by the Posttraumatic Growth Inventory. There were no significant differences between levels of education on Posttraumatic Growth Inventory scores,  $F(4, 95) = .70$ ,  $p = .59$ . Level of education did not make a significant impact on scores on the Posttraumatic Growth Inventory.

#### *3.4.11.3 Whether peritraumatic distress, number of earthquake-related traumatic events, distress associated with these events, life stressors, difficulty associated with life stressors, gender, and social adjustment contribute to variance in posttraumatic growth*

Univariate analysis was used to examine which variables had some degree of association with scores on the Posttraumatic Growth Inventory ( $p < 0.1$ ). These variables were then entered into a general linear model to determine the independent effect of these variables on scores on the Posttraumatic Growth Inventory. Variables of interest were total number of traumatic events during and since the earthquakes (Traumatic Exposure Severity Scale: Occurrence subscale scores); total distress from

traumatic events during and since the earthquakes (Traumatic Exposure Severity Scale: Distress scores); peritraumatic distress during the earthquakes (Peritraumatic Distress Inventory scores); number and difficulty of life stressors (Crisis in Family Systems scores); gender; and social adjustment (Social Adjustment Scale scores). Preliminary analyses were conducted to ensure there was no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. The Traumatic Exposure Severity Scale: Distress subscale scores violated the assumption of normality and were therefore transformed using a square root transformation, resulting in the variable fitting a normal distribution. Data for skewness, kurtosis, and normality of transformed variables can be seen in Table 2.

Variables that correlated significantly with the total score on the Posttraumatic Growth Inventory were entered into a hierarchical regression model. Univariate correlations ( $p < .1$ ) were considered candidate predictor variables and were entered into the model. These variables were gender ( $r = .22, p = .03$ ), total number of traumatic events during and since the earthquakes ( $r = .33, p = .001$ ), total distress from traumatic events during and since the earthquakes ( $r = .41, p < .01$ ), social adjustment ( $r = .18, p = .08$ ), and difficulty with life events ( $r = .45, p < .01$ ).

Gender was entered at Step 1, then at Step 2 the total number of traumatic events during and since the earthquakes and the total distress from traumatic events during and since the earthquakes were entered. Also entered were peritraumatic distress, social adjustment, and difficulty with life events. After entering these variables, multicollinearity was detected with the variable indicating the total distress from traumatic events during and since the earthquakes, showing a variance inflation factor of 6.73. This variable was therefore excluded from the analysis and the hierarchical regression was repeated.

Gender was entered at Step 1, explaining 5% of the variance in posttraumatic growth. After entry at Step 2 of total number of traumatic events during and since the earthquakes, peritraumatic distress, social adjustment, and difficulty with life events, the total variance explained by the model as a whole was 29%,  $F(5, 93) = 7.65, p < .001$ . Total number of traumatic events during and since the earthquakes, peritraumatic distress, social adjustment, and difficulty with life events explained an additional 25% of the variance in posttraumatic growth, after controlling for gender,  $R^2 = .25, F(4, 93) = 8.14, p < .001$ . In the final model, peritraumatic distress and

difficulty with life events both made significant unique contributions to the model.

Peritraumatic distress contributed significantly to the model ( $\beta = .23, p = .04$ ).

Difficulty with life events also contributed significantly to the model ( $\beta = .28, p < .01$ ).

Total number of traumatic events during and since the earthquakes did not contribute significantly to the model ( $\beta = .09, p = .41$ ), nor did gender ( $\beta = .12, p = .20$ ) or social adjustment ( $\beta = .10, p = .3$ ).

In regards to exploratory question 3, among the variables tested (peritraumatic distress, number of earthquake-related traumatic events, distress associated with these events, life stressors, difficulty associated with life stressors, gender, and social adjustment), peritraumatic distress and difficulty with life events contributed significantly to levels of posttraumatic growth.



### **3.5 Discussion**

The current study examined posttraumatic growth in a group of individuals coping well after events following the uniform potentially traumatic experience of the Canterbury earthquake sequence of 2010 and 2011. The study aimed to examine the association between posttraumatic growth and resilience in a population coping well after trauma, to explore whether resilience might preclude posttraumatic growth. The study also aimed to examine the types of distress and objective levels of traumatic exposure that are associated with posttraumatic growth in individuals coping well after trauma. The study looked to explore whether types of distress show a curvilinear association with posttraumatic growth in this population, similar to studies including individuals with psychological problems after trauma. Next, the study examined associations between aspects of social adjustment and posttraumatic growth, to clarify which elements of adjustment relate to posttraumatic growth in the current sample and to expand understanding of posttraumatic growth in regards to adjustment. Next, the study aimed to examine differences between genders on the types of earthquake-related distress reported and the levels of posttraumatic growth reported, and to test for associations among distress variables, posttraumatic growth, and gender. Age and education were considered as possible contributors to levels of posttraumatic growth, as some studies have reported age as an influence on posttraumatic growth, whereas others have not.

Contrary to Hypothesis 1, resilience was not found to relate to posttraumatic growth. Findings indicate that in a group of individuals coping well after a trauma, variations in resilience do not have a direct effect on the posttraumatic growth process. Where individuals do not exhibit psychopathology, higher resilience does not prohibit or encourage posttraumatic growth, and posttraumatic growth is not an aspect of resilience. Such findings are important for extricating the roles of resilience and posttraumatic growth after trauma, and understanding that posttraumatic growth can exist in relatively resilient individuals. Findings have important theoretical implications for considering the role of resilience in the process of posttraumatic growth.

A wider range of resilience scores in the current study may have elucidated any possible influence of lower resilience on posttraumatic growth; however, lower resilience may have corresponded with psychopathology or different coping styles,

and may not have been representative of individuals coping well after trauma. The general level of resilience in the participant sample may mean that a curvilinear association between distress and posttraumatic growth is less likely, as resilience may preclude an individual experiencing an event as so extremely traumatic that it leads to difficulty coping.

Models of posttraumatic growth do not explicitly describe resilience as an influence on the posttraumatic growth process. However, some theorists of posttraumatic growth (Tedeschi & Calhoun, 1996) hypothesise that resilience might preclude an individual from experiencing events as traumatic, and therefore mean that they are less likely to exhibit posttraumatic growth. Findings in the current study indicate that resilience does not prevent an individual from processing an event to find positive significance in a traumatic event and develop posttraumatic growth. However, levels of posttraumatic growth in the current study were lower than in other studies with samples including individuals experiencing a range of psychological difficulties after a trauma. It is likely that levels of distress at the time of the earthquakes were generally lower in the current resilient sample than in samples including individuals with posttraumatic stress disorder. The mean score on the Peritraumatic Distress Inventory did not reach the cut-off score suggested by Guardia et al. (2013) to predict posttraumatic stress disorder 1 month later. Thus, lower levels of distress may have engendered fewer challenges to worldviews, less cognitive and emotional processing, and lower overall posttraumatic growth.

The fact that posttraumatic growth was displayed by participants bears examining. Janoff-Bulman (2004) suggested that some domains of posttraumatic growth, such as viewing the self as stronger, can emerge without specific challenges to worldviews, which could partially explain findings in the current study showing that resilient individuals show posttraumatic growth. However, participants showed growth in domains of posttraumatic growth other than Personal Strength, such as Relating to Others, New Possibilities, and Appreciation of Life. Findings could indicate that worldviews were challenged in the current study, and this triggered a rebuilding of perspectives to give posttraumatic growth, or that posttraumatic growth can happen outside of the context of challenged worldviews. Future research is needed with resilient populations to explore the extent of challenge to worldviews in the context of posttraumatic growth.

The overall mean score on the Posttraumatic Growth Inventory in the sample was 37.44 ( $SD = 22.58$ , range = 0 to 93). Subscales were endorsed to similar extents as each other, with the exception of lower endorsement of Spiritual Change. Scores can be compared to measurement of posttraumatic growth in a Chinese study of adults a year after the Wenchuan earthquakes (Xu & Liao, 2011), although it is important to note that culture and time after the earthquakes may influence posttraumatic growth scores. Subscale means in the current study are: Relating to Others = 12.90; Personal Strength = 8.65; New Possibilities = 7.75; Appreciation of Life = 6.34; and Spiritual Change = 1.60. Scores from Xu and Liao's (2011) study do not include the Spiritual Change scores as they did not deem this subscale relevant to their participant sample. Means for subscales in the Chinese study were: Relating to Others = 26.74; Personal Strength = 9.86; New Possibilities = 11.92; and Appreciation of Life = 7.15. Scores from Xu and Liao's study are similar to the current study, with the exception of Relating to Others, which is lower in the current study. This may be a function of cultural differences in social relationships, influenced by collectivism and individualism. This possibility will be explored in more detail below.

The overall mean Posttraumatic Growth Inventory score (37.44) was slightly lower than other study means reported, which range from 40.30 to 83.47 (Linley & Joseph, 2004; Powell, Rosner, Butollo, Tedeschi, & Calhoun, 2003), with most means in the range between 60 and 70. Means reported in these studies were mostly from studies with individuals after stressful or traumatic events. Tedeschi and Calhoun's (1996) study with North American students after no stressful event reported a mean of 70. Additionally a study of South African bereaved parents reported posttraumatic growth for a healthy control group of women with a mean of 56 (Polatinsky, 2000). No studies focused on samples of individuals coping well after a trauma. It may be that the overall scores on the Posttraumatic Growth Inventory are lower for the current study because the sample did not include individuals with psychological problems after the earthquakes. Posttraumatic growth can occur if an individual is resilient, but experiencing distress is still an important part of the posttraumatic growth process for this individual. Clinical psychological difficulties may relate to a higher level of peritraumatic distress (Guardia et al., 2013), which has in turn been found to relate to posttraumatic growth. According to Joseph and Linley's (2005) organismic valuing theory of growth through adversity, both individuals who develop posttraumatic growth and those who develop posttraumatic stress disorder experience distress,

intrusions, and avoidance after a trauma. Individuals who have difficulty cognitively and emotionally processing their trauma develop posttraumatic stress disorder. Those who can process their trauma successfully may go on to look for meaning in the trauma, and may develop posttraumatic growth. Perhaps participants did experience some intrusions and avoidance, but were able to effectively cognitively and emotionally process their experiences and go on to find some significance in the earthquake events for their lives, which may lead to posttraumatic growth.

The organismic valuing process also posits that individuals who are in tune with their instincts on how best to cope and meet their needs will more likely effectively process a traumatic event, and go on to find positive meaning in their experience. It is possible that the people making up the sample in the current study were able to use effective coping skills to meet their needs and process their earthquake experiences. Perhaps such an organismic valuing instinct is more easily accessible to individuals with higher resilience, acting as an additional resource upon which they can draw to cope with challenging circumstances. Results from the current study cannot shed light on the organismic valuing process and whether this influenced levels of posttraumatic growth. Study 2 explores possible mechanisms in the organismic valuing process leading to posttraumatic growth.

Both Calhoun et al.'s (2010) and Joseph and Linley's (2005) models of growth after adversity incorporate emotional distress as an integral part of the posttraumatic growth process. Joseph and Linley posit that the process of incorporating a new trauma into one's previous worldviews is distressing, and Calhoun et al. suggest that emotional distress is one of the outcomes of an event that is disruptive to one's worldviews, and that this distress can continue during the posttraumatic growth process. However, specific types of distress are not described by these models. Research suggests that peritraumatic distress, posttraumatic stress disorder symptoms, and objective and perceived stressfulness of events encourage more posttraumatic growth. Some research findings indicate a strong curvilinear relationship between posttraumatic growth and posttraumatic stress disorder symptoms (Shakespeare-Finch & Lurie-Beck, 2014). The few studies examining peritraumatic distress in association with posttraumatic growth have found curvilinear associations between peritraumatic distress and posttraumatic growth; for example, significant quadratic and linear relations were found between posttraumatic growth and peritraumatic distress using curve estimation regression analyses (Kunst, 2010). Up to a certain level of distress,

posttraumatic growth increases, but above that level of distress, posttraumatic growth decreases, perhaps because the distress overwhelms the individual. Contrary to Hypothesis 2, findings from the current study indicate that, in individuals coping well, some experiences of distress still relate positively to posttraumatic growth. Findings also indicate that, among resilient individuals, higher levels of distress do not compromise levels of posttraumatic growth so that posttraumatic growth falls as distress increases. This lends support to the proposition that resilience influences an individual's response to trauma so that distress is manageable for this individual, and this may have a flow-on effect that influences levels of posttraumatic growth. The resilience of the sample may have meant that a lower level of distress was experienced in response to earthquake events compared with individuals exhibiting less resilience. This possibility is supported by research showing that individuals higher in resilience appraise a stressful situation, such as public speaking, as less threatening than individuals lower in resilience (Tugade & Fredrickson, 2004).

Findings from the current study show a moderate linear association between peritraumatic distress and posttraumatic growth, rather than a curvilinear association, so that, in the current sample of resilient individuals, higher peritraumatic distress (which entails experiences such as feeling helpless, thoughts one might die, or feeling ashamed or horrified, as measured by the Peritraumatic Distress Inventory) predicted higher levels of posttraumatic growth. Three other studies have examined the association between peritraumatic distress and posttraumatic growth (Kleim & Ehlers, 2009; Kunst, 2010; McCaslin et al., 2009). These studies found a curvilinear association between distress and posttraumatic growth, where moderate levels of distress related to higher levels of posttraumatic growth. All three studies used samples that included participants experiencing a range of posttraumatic stress disorder symptoms, indicating some difficulty processing the trauma. Some participants in these three studies may have had their coping abilities overwhelmed by their experience, and thus a greater response of horror, helplessness, and fear at the time of the trauma may have hindered the posttraumatic growth process. In the current study, the mean score on the Peritraumatic Distress Inventory was 1.03 ( $SD = .63$ ), indicating on average a low level of distress during the earthquakes, and falling under the proposed cut-off score that Guardia et al. (2013) suggest predicts posttraumatic stress disorder 1 month later. In essence, on average participants in the current study reported it 'slightly true' that they experienced each of the following examples (to list

a few): helplessness, guilt, fear for personal safety, horror, worry about others, physical responses such as shaking, or having thoughts that they might die. Coping well was a requirement for participation in the current study and it appears that in the current sample, participants were not so overwhelmed by their immediate earthquake experience that they had difficulty coping or processing their experiences.

Findings indicate that current models of posttraumatic growth that incorporate distress as an integral part of the posttraumatic growth process (Calhoun et al., 2010; Joseph & Linley, 2005) are applicable to resilient individuals. The current study adds details regarding the types of distress that play a part in the posttraumatic growth process. The three types of distress are peritraumatic distress, distress associated with exposure to earthquake-related events during and since the earthquakes, and distress relating to stressful life events. All three measures of distress showed linear associations with posttraumatic growth, but not curvilinear associations. Associations between each type of distress are examined below in relation to existing models and other research about posttraumatic growth.

Fergusson et al. (2014) found the same positive linear association between recalled distress associated with the Christchurch earthquakes and positive changes after the earthquakes, using methodology different from the current study and a sample representative of the general Christchurch population. However, Fergusson et al. (2014) did not test for a possible curvilinear association between distress and positive change; therefore, it is not possible to draw the conclusion that the findings in the current study, which found a linear rather than a curvilinear association between distress measures and posttraumatic growth, were a result of the sample's resilience. Future research could explore the possibility that people coping well after earthquake exposure experienced less distress in comparable circumstances than others who developed posttraumatic stress disorder.

Distress associated with different aspects of earthquake experiences (measured by the Traumatic Exposure Severity Scale: Distress subscale) was significantly positively correlated with posttraumatic growth. This measure was a more general report on recalled distress associated with each stressful aspect of the earthquakes reported according to the Traumatic Exposure Severity Scale. For example, participants were asked to rate how distressing each item was for them on a 5-point Likert-type scale. The measure tapped into longer-term difficulties that resulted from dealing with

disruption to services, housing challenges, employment disruption, interpersonal stresses, personal health, and bereavement. One caveat with this measure of distress is that it is linked to the number of difficulties for each participant. For each item, participants indicated whether they had been exposed to a difficult circumstance as a result of the earthquakes, and if so, how distressing it was experienced to be. For example, if a participant does not endorse the item regarding needing shelter after the earthquake, a score of 0 will be given for this item (with a corresponding distress score of 0 because the item has not been endorsed). Where a participant reports having been in need of shelter after an earthquake, the instruction is to indicate the associated distress on a 5-point Likert-type scale, with 1 representing no distress at all and 5 representing extreme distress. As such, if a participant had been exposed to many traumatic elements, yet felt no associated distress, it is possible to inflate the distress score through endorsing the *occurrence* of several events, yet not endorsing any associated *distress*. However, subtracting the number of traumatic events from the distress scores still produced a significant correlation between the Traumatic Exposure Severity Scale: Distress subscale and scores on the Posttraumatic Growth Inventory ( $r = .41, p < .001$ ). Examining the mean occurrence of traumatic events ( $M = 5.15, SD = 2.56$ ) and the distress scores associated within this sample ( $M = 15.42, SD = 10.8$ ), it appears that, on average, these events were moderately distressing for participants, as a mean rating of 3 was given. This finding is comparable to the pattern in other studies finding that the recalled perceived stress associated with a trauma correlates positively with posttraumatic growth (Helgeson et al., 2006; Stanton et al., 2006).

In regards to the unanswered question of how life events might influence levels of posttraumatic growth, findings from the studies in the current thesis showed that higher levels of reported difficulty experienced in dealing with other stressful life events in the 5 years prior to assessment (measured by the Traumatic Exposure Severity Scale) related to increased posttraumatic growth. The scale measured difficult life events, such as financial hardship, legal problems, career events, relationship events, personal illness, illness or death of others, safety in the community, safety at home, home issues, difficulty with authority, and prejudice. The time period measured was from 2008 to 2013, including events prior to the earthquake sequence beginning in September 2011. These results are comparable to those of other studies that have assessed the level of peritraumatic distress respondents report

experiencing at the time of a specific trauma, and found that higher recalled peritraumatic distress corresponds with higher posttraumatic growth (Wild & Paivio, 2003). This finding is interesting in light of the absence of significant correlation between the number of reported stressful life events and posttraumatic growth; it appears that for life events, only the distress associated with the events is associated with the process of posttraumatic growth. It is possible that prior difficult life events have helped participants gain a perspective that facilitates the process of posttraumatic growth in the current study.

As expected, objective severity of threat (measured by the Traumatic Exposure Severity Scale: Occurrence subscale) was positively correlated with levels of posttraumatic growth. This scale measures features of earthquake experiences, such as being alone at the time of one of the major earthquakes; being responsible for minors; being in need of food, water, or essential services; having to relocate; being injured; losing loved ones; or having difficulties dealing with insurance companies or the EQC. Participants reported experiencing an average of five of these stressful earthquake events. This positive correlation between the number of earthquake difficulties and posttraumatic growth is consistent with Helgeson et al.'s meta-analysis (2006) indicating that a higher level of objective event severity (e.g., stage of a disease or a physician rating) related to higher levels of posttraumatic growth. This also relates to notions of a 'dose-response' effect (Powell et al., 2003) where an event characterised as potentially more traumatic predicts higher posttraumatic growth. In addition, the current study's findings also relate to subjective judgements of higher stressfulness of an event being related to higher posttraumatic growth. Results from the current study further support the assertion that the struggle with trauma produces an opportunity for posttraumatic growth to develop (Calhoun & Tedeschi, 1998).

The theory that distress is a component of the struggle with experiencing and processing traumatic events, which can lead to a search for meaning and realisation of posttraumatic growth, is supported by findings that posttraumatic growth is associated with distress and difficulty over life events and traumatic events (Calhoun & Tedeschi, 2006). Individuals who experience some distress in response to earthquake-related events have an opportunity to respond to this distress in ways that support development of posttraumatic growth. In the examination of which factors best predicted posttraumatic growth, peritraumatic distress and difficulty associated with life events were the strongest predictors, indicating that the distress experienced in



response to an event is the most important predictor of posttraumatic growth. Although a correlational analysis does not answer questions of causation, findings are consistent with models of posttraumatic growth that suggest distress precedes the posttraumatic growth process. Future research could use longitudinal analysis to examine possible causal associations of peritraumatic distress and difficulty with life events to ascertain whether posttraumatic growth relates to ongoing distress or rather is a response to a discrete period of distress

As expected, gender influenced the association of distress and posttraumatic growth, such that women experienced more peritraumatic distress and more difficulty with life events, and this led to higher levels of posttraumatic growth. The current sample of individuals who were coping well after the earthquakes showed similar patterns of distress and posttraumatic growth to a representative sample of Canterbury residents. Fergusson et al. (2014) noted in their study of Canterbury residents that women described more distress at the time of the earthquakes and reported more positive consequences of the earthquakes (such as appreciation of life). The current study shows the same pattern in a resilient sample, using well-validated measures that have been used in many international studies of posttraumatic growth. Additionally, exploration of the association between gender and distress confirms that women are more likely to respond with distress at the time of the earthquakes (peritraumatic distress) but are not likely to report greater distress than men associated with all earthquake-related disruptions to life after the earthquakes. A strength of the current study is that peritraumatic distress is separated from general distress associated with the objective severity of earthquake exposure (measured by the Traumatic Exposure Severity Scale), such as insurance struggles and loss of shelter; in the study by Fergusson et al. (2014), these two aspects of distress were merged into one variable. Thus, the current study's findings clarify that peritraumatic distress is more likely to affect women than men, and peritraumatic distress contributes to women's posttraumatic growth, more than to men's posttraumatic growth as seen by the mediating effect of peritraumatic distress on the association between gender and posttraumatic growth.

As such, gender may influence an individual's experience, perception, and response to trauma, and so provide different outcomes. It may be that women experience more emotional distress than men in response to a challenging situation and also ponder more on their own positive experiences that emerged from the earthquakes,

engendering more space for posttraumatic growth. These findings are in line with findings from Fujita et al. (1991) that women report more intense emotional experiences than men, both happy and sad. Individuals who experience higher affect intensity are also more likely to think about events in a certain way, taking more personal responsibility, focusing more on emotive aspects of the event, and viewing the event as representative of all events (Larsen et al., 1987). It is possible that these thinking styles combined with cognitive strategies of reflection or rumination may produce higher affect intensity. Such reflection has been noted to relate to posttraumatic growth, and may involve a search for meaning in one's experience, a search for any positive outcomes, and a reminder of the gains one has achieved through the struggle with hardship (Lindstrom et al., 2013). If women are more likely to experience intense affect, and also more likely to reflect on this affect, these attributes may contribute to a higher level of posttraumatic growth. This area requires further research.

If women were more socially free to report distress, and more at ease to enthusiastically report positive outcomes, women might be more likely to report more distress in response to aspects of their earthquake experience such as damage to property or insurance hassles (as measured by the Traumatic Exposure Severity Scale). This is not the case, which suggests that they do recall experiencing more peritraumatic distress than men.

Women reported more difficulty with life events than did men, and this higher level of difficulty was associated with more posttraumatic growth. Women have previously been found to experience stressful life events as more distressing in regards to events affecting their social network. Specifically, men and women were found not to differ in their reported distress regarding stressful events occurring to close family; however, women reported more distress around events occurring to others in their social circles (Kessler & McLeod, 1984). Perhaps the higher potential to be affected by stressful events engenders more opportunities to tackle difficulties; a possible outcome of dealing with difficult life events is a boost to self-efficacy, which may give an individual courage and confidence to face further adversity. Such self-efficacy has been noted to relate to posttraumatic growth (Lotfi-Kashani, Vaziri, Akbari, Kazemi-Zanjani, & Shamkoeyan, 2014; Luszczynska & Stoeber, 2009).

In the subscales of posttraumatic growth, women were found to report higher levels of Appreciation of Life and of gains in Personal Strength, as hypothesised. In the current sample, however, women did not differ from men in their reported Spiritual Change, but did report more improvements in Relating to Others. Women and men's scores on the Spiritual Change subscale do not differ. This is inconsistent with findings in previous research that women endorse Spiritual Change more highly. This may in part relate to the lower levels of religiosity in New Zealand than in other countries where posttraumatic growth has been studied: both men and women reported relatively low levels of Spiritual Change. Increased scores on the Relating to Others subscale indicate a deepening of relationships, greater compassion for others, and a greater appreciation of others. These may have occurred for both men and women as a result of the Christchurch community working together to respond to the earthquake and of individuals meeting the needs of others. It is possible that women experienced a greater connection with others at this time because of a greater proclivity for seeking emotional support from others (Tamres et al., 2002) and a greater likelihood of considering relationships outside of immediate family as important, therefore investing more in these emotionally (Kessler & McLeod, 1984). Women are also more likely to offer social support and have a greater number of confidants than men (Shumaker & Robin, 1991). In this way, where the earthquakes presented a challenge for participants and those around them, women may have been more likely to reach out to existing friends and to make new friends in whom they could confide. Women reporting greater perception of Personal Strength may relate to differences in responses to adversity: a greater likelihood for women to learn from events experienced as more difficult, and in turn a greater likelihood for them to perceive increased personal capability. Women may have been more likely to develop increased Appreciation of Life in response to greater peritraumatic distress and perception of life being threatened. Items in the New Possibilities subscale include 'I have developed new interests', 'I established a new path for my life', and 'New opportunities are available which wouldn't have been otherwise'. For the uniform traumatic experience of the Canterbury earthquake sequence, women and men in the current sample do not differ on the new paths or opportunities available to them after the trauma. It is possible that varied traumas in other studies may have influenced men and women differently, to produce differences in scores on the New Possibilities subscale. It is also possible that cultural influences on gender roles for men and

women are different in New Zealand compared with other countries, and that this may have some influence on the possibilities available to men and women before and after a trauma. It is difficult to ascertain whether culture or type of trauma influences gender differences on subscales of the Posttraumatic Growth Inventory, because no other studies have used the Posttraumatic Growth Inventory in New Zealand to date, and the current study measures posttraumatic growth after the same trauma occurring to men and women.

Findings suggest that models of posttraumatic growth should be modified to acknowledge specific aspects of distress that relate to posttraumatic growth in those coping well after trauma. Peritraumatic distress, distress from ongoing earthquake-related disruptions, and distress related to major life events are associated with greater posttraumatic growth. Further, individual differences, such as gender, influence the level of distress experienced and, through this, the level of posttraumatic growth seen.

The overall findings that women reported more posttraumatic growth may relate to differences in coping strategies between men and women. Women are more likely to reflect on their experiences in order to find meaning from them that relates to their lives (Treyner et al., 2003). Women are also more likely to use ‘emotion-focused coping’ techniques, which are behavioural and cognitive strategies used to maintain emotional stability, such as distraction, trying to ‘take a step back’ to gain an objective perspective, looking for positive aspects of a situation, deciding not to worry about the event and hope it resolves itself, exercising, and eating or smoking in response to emotions (Billings & Moos, 1981). The cognitive activities of thinking about an event, trying to make sense of it, and trying to come to terms with it cognitively may fall into such a category of ‘emotion-focused’ strategies (Vishnevsky et al., 2010). These cognitive techniques are used in the struggle after a potentially traumatic event, as suggested by Calhoun and Tedeschi (2006). Additionally, emotion-focused coping techniques of positive reappraisal, acceptance, and denial were also found to relate to finding benefits in one’s experiences in Helgeson’s (2006) meta-analysis. The finding the women engage in more emotion-focused coping than men and that this style of coping relates to posttraumatic growth suggests that women’s coping responses positively influence the process of posttraumatic growth.

Contrary to Hypothesis 4, satisfaction with social relationships was also associated with increased posttraumatic growth, indicating that less satisfaction with

relationships related to higher posttraumatic growth. These findings are not consistent with Calhoun et al.'s (2010) comprehensive model of posttraumatic growth, which posits that social support encourages the posttraumatic growth process. The findings are also not in line with previous research on relationships indicating that the expectation of a supportive response on emotional disclosure encourages intimacy and posttraumatic growth (Prati & Pietrantonio, 2009). The subscale of Feelings of Satisfaction contained items measuring frequency of feelings of affection for family and partner; worries about family; feeling let down by family; feeling as though one is letting others down; and satisfaction at work and home. It is possible that these items might be affected by stress incurred by the earthquakes. It is very likely participants were worrying about difficulties their loved ones were undergoing. This subscale could thus be influenced by the nature of dealing with large-scale earthquake trauma and not accurately reflect social adjustment in this context. Such factors could be considered in future research examining social adjustment or social support and its association to posttraumatic growth.

Also contrary to expectations, findings did not show that posttraumatic growth was associated with the Social Adjustment Subscale: Interpersonal Behaviour subscale. This subscale described freedom of communication with friends and family as well as effort in spending time with them. This is not consistent with previous studies that have found that ease of disclosure is associated with posttraumatic growth (Taku, Tedeschi, et al., 2009) or the theory that positive responses to disclosure encourage posttraumatic growth (Calhoun & Tedeschi, 2006). It is possible that this subscale does not capture ease of social disclosure well. A more specific measure for assessing ease in expressing one's feelings to others may find an association between disclosure and posttraumatic growth in the current sample.

Further, overall social adjustment did not relate to posttraumatic growth. The means of the Social Adjustment Scale subscales were generally low, indicating participants to be well adjusted in their roles at work, home, and with friends and family. As these measures do not reflect social support but rather a measure of functioning, it is not surprising that the overall Social Adjustment Scale score is not related to posttraumatic growth. Adjustment has not been consistently found to relate to posttraumatic growth. The current study shows that in the case of a resilient sample, overall social adjustment is not an outcome of posttraumatic growth or a contributor to the process of posttraumatic growth. It may be that, where emotional and

instrumental performance in one's role is more compromised in a sample including lower levels of resilience, there is an effect on levels of posttraumatic growth; this is an area for future research.

In the current study, contrary to Hypothesis 5, age was unrelated to posttraumatic growth for women and men. Although younger age has been found to relate to higher growth in some studies, it may be that this sample did not include participants young enough to experience a significantly greater challenge to their life assumptions, or that these results are influenced by a statistical effect of a truncated sample age. Six percent of the current sample was between 18 and 29 years old, and the mean age was 50 years. This is in contrast to Helgeson et al.'s (2006) meta-analysis, which noted the association between age and posttraumatic growth over 87 studies, with mean ages of studies from 28 to 73 years and a range of ages across studies from 18 to 86 years. The range of mean ages in the meta-analysis of 70 studies by Vishnevsky et al. (2010) ranged from 16 years to 67 years. Findings are consistent with the comprehensive model of posttraumatic growth (Calhoun et al., 2010) and the organismic valuing theory of growth through adversity (Joseph & Linley, 2005), which do not specify age as a factor influencing the process of posttraumatic growth.

In regards to the unanswered question of how education might influence levels of posttraumatic growth, in the current sample a lack of association was shown between education and posttraumatic growth. These findings are unsurprising given inconsistent findings of the associations between education and posttraumatic growth or socioeconomic status and posttraumatic growth (Helgeson et al., 2006; Stanton et al., 2006). Findings from the current study show that level of education is not associated with the way one processes traumatic events to result in posttraumatic growth. It is possible that education does not relate to income or socioeconomic status in New Zealand the way that it might in other countries, negating any relationship between education, other resources, and posttraumatic growth.

### ***3.5.1 Possible cultural influences on levels of posttraumatic growth***

The comprehensive model of posttraumatic growth (Calhoun et al., 2010) posits that culture is an important influence on the posttraumatic growth process. Existing research indicates that posttraumatic growth varies according to the country in which it is studied: North American samples tend to report higher levels of posttraumatic growth than other countries. German survivors of motor vehicle accidents studied by

Zoellner et al. (2008) were found to report lower levels of posttraumatic growth than North American samples, although means were not reported. Japanese citizens were found to report lower posttraumatic growth scores on the Posttraumatic Growth Inventory ( $M = 44.74$ ,  $SD = 20.25$ ) than North Americans ( $M = 53.98$ ,  $SD = 21.61$ ) in samples of university students after a variety of trauma (Taku & Cann, 2014). Spanish citizens reported less posttraumatic growth after exposure to the Madrid train bombings than North American citizens reported after exposure to the 9/11 attacks (measured with a short form of the Posttraumatic Growth Inventory; Steger, Frazier, & Zacchanini, 2008). Posttraumatic growth was also lower than North American samples in an Australian study after various trauma ( $M = 51.97$ ,  $SD = 21.40$ ; Morris et al., 2005). Some authors have speculated that North American participants are subject to a ‘tyranny of positive thinking’, where they may feel socially obliged to find positive aspects to their adverse experiences (Lechner & Antoni, 2004). The current sample has its own cultural influences, possibly including ideas of New Zealand identity as self-sufficient, stoic, and ‘laid back’ (Braun, 2008); such ideas may influence respondents to report lower levels of posttraumatic growth than in North American studies because of associated emotional restraint.

### ***3.5.2 New Zealand concepts of cultural identity***

Cultural influences may affect aspects of the posttraumatic growth model through common narratives and norms regarding appropriate actions, interactions, and coping strategies. Sociologists writing about everyday life in New Zealand note that there is a strong ‘do it yourself’ drive to complete one’s own work on projects around the home rather than outsource such work (Cox, 2013; Perkins & Thorns, 2001). Similarly, some research has noted groups of Pākehā (New Zealanders of European descent) describing the New Zealand identity as self-sufficient, stoic, and laid back (Braun, 2008). Such philosophies may encourage practical, active coping in response to crises, with individuals working to find their own solutions to problems; this approach has been noted to relate to higher posttraumatic growth and could support a sense of efficacy and personal strength. This possibility warrants further research.

### ***3.5.3 The nature of individualism and collectivism in New Zealand***

Levels of individualism and collectivism may influence responses to potentially traumatic events through norms and values; however, it is not reliable to classify entire nations according to citizens’ average endorsement of these values, because of

the variability among individuals. Some research has shown that differences between ethnic groups can be seen when average scores on certain values are compared (Shulruf, Hattie, & Dixon, 2007). In this way, more of a nuanced view can be noted, with groups endorsing both 'individualist' and 'collectivist' values in differing patterns. On average, research indicates that Māori and Pākehā endorse more individualist values, more highly, than collectivist values (Shulruf et al., 2007). Individualist values include: taking responsibility for one's actions; seeing the self as unique and distinct from others; and striving for one's personal goals as a life priority. Collectivist values include: asking others for advice when making decisions; and seeking to promote social harmony and avoid social conflict. Both individualists and collectivists report valuing close family and feeling a sense of duty to them (Orrange, 2003; Oyserman, Coon, & Kemmelmeier, 2002; Shulruf et al., 2007). Shulruf et al. (2007) found that, overall, different ethnicities in New Zealand have different worldviews. Māori and Pākehā are similar in the individualist values of taking responsibility and uniqueness, whereas Pākehā also endorse to some extent the value of social harmony (generally considered a collectivist value). Pacific Island and Asian New Zealanders endorse individualism in different ways, such as prioritising personal goals, whereas both value advice from others, which is traditionally associated with collectivist values. In the process of posttraumatic growth, it is possible that these values will influence meaning making: those who hold individualist values may be more likely to attribute events to personal efforts and more likely to use active coping to change their circumstances than to seek to adjust themselves to the circumstances.

Ethnicities of participants in the current study were as follows: 98 participants identified as Pākehā or European; one was of Māori descent; one was of Cook Island Māori descent; and one was of Indian descent. Although the New Zealand population has been described as generally individualist, in the current study measures of individualism and collectivism were not made, and it is not possible to use nationality or ethnicity as a proxy for levels of individualism and collectivism. It is likely that individualist values play into the process of posttraumatic growth in a variety of ways, such as influencing the likelihood of seeking social support where individualists are more likely to express and encourage disclosure of emotional difficulties. In addition, individualism has been noted to relate to extraversion (Hofstede & McCrae, 2004), which in turn has been found to positively correlate with posttraumatic growth (Jia et al., 2015; Tedeschi & Calhoun, 1996). Rates of posttraumatic growth in a



replicated study, with a higher proportion of collectivist individuals in the participant sample, might be lower than in the current study.

In the current study, it is possible that resilience influences some of the ways participants respond to events (Wilson et al., 2014) and that culture asserts additional influence on the same responses to adversity. For example, resilience encourages individuals to appraise adversity as a challenge and respond to it using tools available to them, such as social support. Therefore, the constructs of resilience and culture are likely to influence common variables such as social support, in turn influencing the kind of cognitive and emotional processing that may be part of posttraumatic growth. This is an area for future research.

#### ***3.5.4 Religiosity as an influence on posttraumatic growth***

Calhoun et al.'s (2010) comprehensive model of posttraumatic growth suggests that religious practices such as praying may influence the cognitive process of coping with traumatic events and making sense of an event. Religiosity may also influence social support available to an individual. Religious coping has been found to relate to posttraumatic growth and thus levels of religiosity in a country may influence reported rates of posttraumatic growth. Reports of Spiritual Change in the current study are relatively low in comparison to North American samples involved in the development of the Posttraumatic Growth Inventory (women  $M = 8.29$ ; men  $M = 4.96$ ; Tedeschi & Calhoun, 1996). Throughout New Zealand, according to census data from 2013, affiliation with a Christian religion declined to 48.9% of the population, from 55.6% seven years prior. Those reporting no religion increased to 41.9%, from 34.6% at the previous census in 2006. Other religions increased, with 0.5% identifying as Sikh and 2.2% as Hindu or Muslim (Statistics New Zealand, 2015). These statistics are very similar to Australian statistics, which also show overall declining religious affiliation. In Australia, 50.2% identified with a Christian religion in 2011 and 22.3% identified themselves as having no religion (Australian Bureau of Statistics, n.d.). The rate of New Zealanders indicating they had no religion in 2006 was 34.6%; thus, it appears that the proportion of New Zealanders with no religion is higher than that of Australians. In the context of research comparing posttraumatic growth in Australians and North Americans (Morris et al., 2005), New Zealanders show a similar profile to Australians, reporting low levels of

Spiritual Change compared to the high levels of Spiritual Change found in North American studies.

Strengths, limitations, and implications of the current study will be outlined in the general discussion in Chapter 5.

Findings from the current quantitative study will be explored in the following qualitative study, investigating themes in participants' perceptions of growth. In Study 1 it was demonstrated that, in the current sample, there was no direct influence of levels of resilience on posttraumatic growth, and that resilient individuals exhibited posttraumatic growth. Further, higher levels of peritraumatic distress, higher levels of objective threat, higher difficulty of life events, and higher levels of distress associated with events during and since the earthquakes related to higher levels of posttraumatic growth. Women showed higher levels of posttraumatic growth and these were influenced by women's higher levels of peritraumatic distress and higher difficulty of life events. It remains unclear how the process of posttraumatic growth might be different, for men and women to produce different levels of posttraumatic growth. In Study 2, participants' descriptions of their experiences elucidate the process of posttraumatic growth for individuals coping well after earthquakes; the nature of traumatic exposure and distress; and gender differences in posttraumatic growth and distress. Descriptions of how domains of posttraumatic growth are perceived to have emerged will be important, to indicate possible methods of supporting posttraumatic growth in response to potential future natural disasters in New Zealand.

## **CHAPTER 4**

### **Qualitative analysis of descriptions of posttraumatic growth in a sample of resilient Christchurch residents affected by earthquake-related events. Study 2**

Quantitative analyses in Study 1 found that participants experienced posttraumatic growth, as measured by the Posttraumatic Growth Inventory, with the domain of Relating to Others most highly endorsed, followed by Personal Strength, New Possibilities, Appreciation of Life, and Spiritual Change. In Study 2, the ways participants experienced these positive changes are of interest, as well as the elements they deem to have contributed to their posttraumatic growth. Further, Study 2 aims to examine descriptions of constructs that have been found to correlate with posttraumatic growth in Study 1 and in other quantitative research to date, in particular: distress, optimism, active responses, religiosity, and social support.

Gender differences in Study 1 and other research indicate that posttraumatic growth is endorsed more highly by women. Study 1 also found that women reported more peritraumatic distress in response to the earthquakes and that women experienced life events as more stressful. To further explore these gender differences in Study 2, differences are explored between themes according to gender.

In Study 2, perceptions of posttraumatic growth in response to the Canterbury earthquake sequence are explored in the same sample of participants recruited for Study 1. The study aim was to identify factors that participants coping well identified as contributing to posttraumatic growth. Possible mechanisms facilitating posttraumatic growth are of interest because of the limited understanding of the process of posttraumatic growth to date in individuals coping well after trauma.

Additionally, Study 2 explores qualitatively how posttraumatic growth was expressed by individuals after an earthquake, which has not been studied in existing research.

#### **4.1 Research approach and philosophy**

##### **4.1.1 Qualitative research**

Qualitative analyses are very useful for exploring the nature and nuances of a phenomenon. Such analyses can provide a richness of information that can contribute to understanding other quantitative data with more depth and detail (Braun & Clarke, 2006). For posttraumatic growth, Pals and McAdams (2004) note that thematic

analysis of narratives may provide extra validity to the reports of posttraumatic growth, illustrating how the perception of posttraumatic growth arises from the process of an individual building new schemas to replace older ones. Second, qualitative analysis can provide examples of posttraumatic growth that do not fit inside the preconceived framework of other formal methods of measuring posttraumatic growth, such as the five domains of posttraumatic growth assessed using the Posttraumatic Growth Inventory. For example, in an analysis of themes relating to posttraumatic growth in a group of survivors of life-threatening illnesses (Hefferon et al., 2009), themes of a ‘New awareness of the body’ and ‘Trauma equals development of the self’ were noted along with themes more traditionally associated with posttraumatic growth, such as ‘Reappraisal of life and priorities’. As such, different types of trauma are likely to produce different experiences and different expressions of posttraumatic growth, which are best captured using qualitative techniques so that these unique expressions of posttraumatic growth are not missed by using solely quantitative tools such as the Posttraumatic Growth Inventory.

A recently published study examined themes in letters from a representative sample of 191 Christchurch residents after the September 2010 earthquake, the first earthquake in the sequence (Rowney, Farvid, & Sibley, 2014). Themes of psychological difficulty, logistic or financial difficulty, coping strategies, and a ‘silver lining’ were noted. Psychological difficulties, including fear, anxiety, sleep problems, and hypervigilance were commonly reported. There were reports of feeling ‘in limbo’ or stuck, in regards to property evaluations and insurance arrangements. Financial difficulties were described as a result of loss of businesses or difficulties with insurance payments. Religious coping was described by 10% of participants as helpful, being prepared was commonly reported as comforting, and positive thinking was useful: participants were grateful there was no loss of life and that there was not more structural damage to the city. The ‘silver lining’ theme included subthemes of community cohesion and spirit, and modified priorities regarding valuing people over money. As the study was conducted before the February 2011 earthquake, it was not able to consider themes that may have occurred in response to a fatal earthquake.

The current study expands on these findings by examining themes in the same sample as Study1: a sample recruited after the February 2011 earthquake where lives were lost and Christchurch city infrastructure was devastated. Additionally, the current study enquires specifically about positive changes after the earthquakes and can

therefore provide a more in-depth account of the nature of posttraumatic growth in this population.

#### ***4.1.2 The research approach: Thematic analysis***

Thematic analysis is a widely-used tool in qualitative research for identifying and analysing patterns or themes in a qualitative data set (Braun & Clarke, 2006).

Two methods of thematic analysis are possible: theory-driven and data-driven thematic analysis. Theory-driven analysis is when a researcher begins with a theory of what will be found in the data and describes the kinds of signs that will confirm this theory if they are found in the data. Such analysis involves reviewing prior research to develop codes from existing theories. Theory-driven analysis is more susceptible to researchers projecting expectations of findings onto the data. Theory-driven analysis can also suffer from a mismatch with the data, as codes are developed out of the context of data and may not readily be applied to the material to be coded (Boyatzis, 1998). Data-driven analysis involves noting themes from the data itself, without any prior hypotheses about what analysis will reveal. Codes are developed through close examination of those data that may express ideas not allowed for using a theory-driven analysis. Data-driven analysis is the best option for exploring a phenomenon not previously understood or examined.

There is not one clear theory in the current study, nor is there existing qualitative research about the expression of posttraumatic growth after an earthquake specifically. There are a number of theories of posttraumatic growth that hypothesise general processes of posttraumatic growth regardless of the type of trauma experienced. There is extant research using data-driven thematic analysis to explore the experience of posttraumatic growth in individuals with chronic illness (Hefferon et al., 2009), in parents of children with Down syndrome (King, Scollon, Ramsey, & Williams, 2000), in individuals after a range of traumas (Pals & McAdams, 2004), and in individuals after childhood abuse (Woodward & Joseph, 2003). It is likely that different traumas influence posttraumatic growth differently and that the themes may be qualitatively different after experiencing a natural disaster than the themes in a sample of survivors of other traumas. Therefore, data-driven thematic analysis is preferred for this analysis, to avoid preconceived biases in detecting themes from the current sample of interviews. Data gained can then be examined to ascertain how it fits with existing models and theories of posttraumatic

growth. Where themes become apparent that are similar to themes found in previous studies of posttraumatic growth, these themes can be examined in detail in the current study.

#### ***4.1.3 Considerations for conducting qualitative analysis***

The qualitative research process is reflexive and acknowledges subjectivity and the influence of personal values of the researcher. In order to outline the research approach and findings in a transparent way, a full description of the qualitative enquiry is needed. It is important to acknowledge that the approach of the researcher will be influenced by personal experiences and by such elements as gender, socioeconomic status, religion, and ethnicity. The researcher's feelings and perspective then influence the topic of enquiry and the framing and interpretation of findings (Braun & Clarke, 2006).

In this context it is important to acknowledge that each of the six interviewers will have their own influences and their own approach to following up on questions in the interview prompts. Five women and one man conducted the interviews; four of the interviewers had experienced the major earthquakes, while two had not. Each may have encouraged participants to different extents to elaborate on their narratives. Likewise, three analysts analysed the first 15 transcripts and developed themes to represent the initial common themes noted. These analysts brought their own influences to their analyses. As primary analyst, I acknowledge my own influences, as a Pākehā (New Zealand European), middle-class woman of Christian upbringing. I have had my own traumatic experiences and have perceived an increase in self-knowledge and confidence in my own abilities to carry on after an event that shook me. As such, I have a positive view of the possibilities that difficult life events can introduce to an individual and I identify with reports of posttraumatic growth. Similarly, it is important to recognise that my experiences as a reader are impossible to separate from my experiences as an analyst; during the analysis I recognised that some stories I read inspired and touched me and this may have influenced my approach in analysis. During the qualitative enquiry it has been important for me to be as aware of these influences as possible, taking care to note only what the data state explicitly rather than to interpret each participant's reports of their experiences, as recommended by Boyatzis (1998). As noted in the section above on the research approach, techniques for verifying reliability and validity of findings are also applied

as part of the thematic analysis process used in the current study, as a guard against idiosyncratic interpretation of data by a single analyst (Boyatzis, 1998). In addition to the checks recommended by Boyatzis for determining reliability (such as using a second and third analyst to discuss themes and compare rates of coding agreement), considerable checking has been incorporated into the process of analysis. This involved three analysts coding and checking the first 15 transcripts used for code development. Further, after the primary analyst applied the codes to all transcripts, the total talk for each code was checked by a single analyst to ensure the cohesion within each code. Reliability checks for coding were part of the process for ensuring the soundness of data interpretation for the current study.

## **4.2 Method**

### **4.2.1 Participants**

Participants were the same as those recruited for Study 1: 34 males and 67 females from 18 to 70 years old, who were coping well despite moderate to severe exposure to earthquake events.

### **4.2.2 Procedure**

Participants were interviewed at the Department of Psychological Medicine, University of Otago, Christchurch, or at the University of Canterbury, for twenty minutes to an hour by one of six interviewers (including myself), using semi-structured interview prompts. Interviewers prompted for information about which earthquakes participants had witnessed, their experiences at the time of the earthquakes, and the effects of the earthquakes subsequently. Participants were asked their perceptions of any positive effects from the earthquakes. Participants were prompted to consider whether they identified any aspects of posttraumatic growth, such as changes in perspective, and, where changes were noted, to describe these changes. By keeping interviews semi-structured, participants could describe their experiences in the way they chose. Including prompts about negative and positive aspects of earthquake experiences ensured that participants were not biased to favour negative or positive elements of their experiences. A copy of the interview prompts is included in Appendix F.

Interviews were recorded using Olympus DS-330 dictation software, downloaded, and then transcribed verbatim. During the recording process, one interview was too muffled to understand and another interview was accidentally recorded over, resulting in the loss of two interviews. Anonymity of participants was preserved through the use of participant identification numbers to label audiotapes and transcripts.

### **4.2.3 Interview analyses**

Thematic analysis was used to explore themes expressed in interviews within the remaining 99 interview transcripts. Analysis was based on Boyatzis' (1998) well-established methods for identifying, coding, and describing themes within a piece of communication, illustrated in Figure 4.



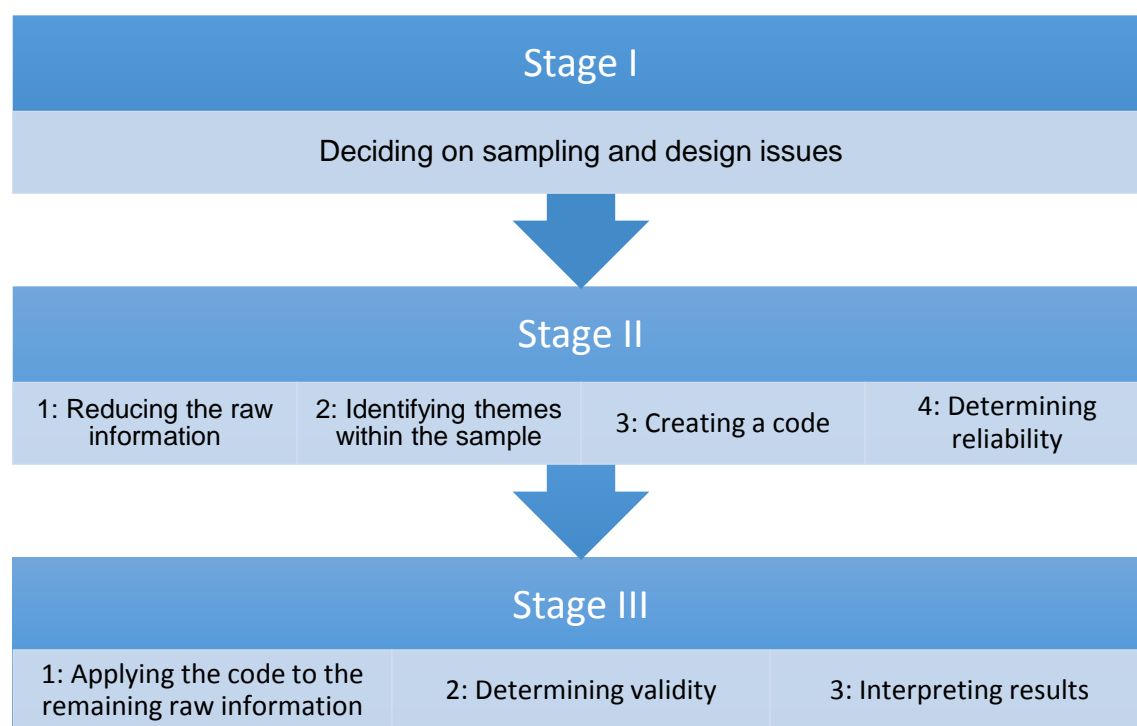


Figure 4: Process for identifying themes in qualitative data (Boyatzis, 1998)

Thematic analysis is an iterative process that often returns to a prior stage to refine and review themes and codes. Details for how these steps were carried out to analyse the interviews are outlined.

#### 4.2.3.1 Stage I – Deciding on sampling and design issues

The current study aimed to explore the *experience* of growth in response to the earthquake sequence in the sample of recruited participants. As such, the sample was one group of Canterbury residents, exposed to earthquake-related stressors and coping well. The study was therefore considered to have a single unit of analysis (one group or culture is being studied).

#### 4.2.3.2 Stage II, Step 1 – Reducing the raw information

Three analysts analysed the first 10 transcripts independently, each examining raw data for emerging themes, similarities, and patterns within the transcripts. Each part of text with a particular theme was highlighted and could consist of a word, sentence, or group of sentences. Analysts described each theme in the margins of a transcript. It was important to note solely what the participants described in the transcript, rather than interpreting any of the pieces of talk; this was in order to preserve the data-driven

method of analysis that specifies that themes are drawn from data rather than from any prior theory.

#### *4.2.3.3 Stage II, Step 2 – Identifying themes within the sample*

Analysts discussed the themes noted from each of the 10 co-analysed transcripts. For themes that one analyst had identified but others had not, analysts discussed their reasoning for noting a theme, and consensus was reached about whether to retain or abandon the theme.

The primary analyst analysed a further five transcripts, looking for new themes that had not occurred in the first 10 transcripts. When transcript analysis produced few further themes, the subset of transcripts analysed thus far was examined for commonly occurring themes, in order to develop an initial coding system to be applied to the rest of the data set, as recommended by Boyatzis (1998). To develop the initial coding system, summaries of each theme identified in the subset of transcripts were written. Each theme was then recorded on a paper slip, and the paper slips were grouped according to similarities among the themes.

#### *4.2.3.4 Stage II, Step 3 – Creating a code*

The process of grouping data according to common themes allowed the creation of codes to summarise each theme. A code consisted of a sentence description of the theme and some examples of each theme.

#### *4.2.3.5 Stage II, Step 4 – Determining reliability*

Similar codes were grouped together and used to draw a diagram of the themes present in the data. Analysts then discussed the diagram of themes. The other analysts gave feedback about whether the primary analyst had missed themes, or whether further aspects of themes needed to be considered. The diagram of themes was modified until a consensus was reached that the essence of each theme was captured.

#### *4.2.3.6 Stage III, Step 1 – Applying the code to the remaining raw information*

The codes were applied to the full data set using the software NVivo.

#### *4.2.3.7 Stage III, Step 2 – Validating the inter-rater reliability of the code*

Ten percent of transcripts were randomly selected and analysed by a second analyst to determine inter-rater reliability.

Inter-rater reliability testing was conducted to ensure the coding system was reliable. A true random number generator, developed by Dr Mads Haahr of Trinity College, Dublin, Ireland (Haahr, 1998), was used to generate 10 numbers at random in the range of the number of interview transcripts analysed (1 to 99). These numbers were used to select 10 transcripts, which the primary analyst and a second analyst coded separately. Each of these 10 transcripts was printed showing coding from both analysts. Codes were compared using a matrix similar to that suggested by Boyatzis (1998), with each codable piece of text numbered to make a row and each analyst a column, showing the code that they used for that piece of text. A matrix was constructed showing the number of times the analysts agreed on a code and the number of times analysts coded text differently. Although any description of results is traditionally not described in the method section of a study, some description of the thematic analysis method depends on some content – for example, development and refinement of themes. Thus, some themes are used in Table 5 to illustrate the method used for calculating Cohen's kappa.

Table 5

*Example of matrix for calculating Cohen's kappa to indicate inter-rater reliability*

	<b>Coder 1</b>					
<b>Coder 2</b>		<u>Burden</u>	<u>How it is</u>	<u>Not bad</u>	<u>Positive</u>	<u>Improvement</u>
	<u>Burden</u>	0	2	0	0	1
	<u>How it is</u>	1	68	2	3	2
	<u>Not bad</u>	0	0	4	0	0
	<u>Positive</u>	0	4	0	16	2
	<u>Improvement</u>	0	0	0	0	6

Inter-rater rates of agreement over the 10 transcripts were calculated, as well as the kappa coefficient, using formulae from Fleiss (1973). Inter-rater agreement was calculated using the following formula:

$$\frac{\text{Number of agreements}}{\text{Number of total pieces of coded data}}$$

Cohen's kappa was calculated to take into account the rate of agreement that could be expected as a result of chance. In order to do this, expected rates of agreement were calculated for each diagonal cell, using the following formula:

$$\frac{\text{Row total} \times \text{Column total}}{\text{Overall total}}$$

Values for each cell are then summed to give an expected rate of agreement. The following formula was used to calculate the kappa for inter-rater agreement:

$$\frac{\sum \text{Diagonal cells} - \text{Expected frequency}}{\sum \text{All cells} - \text{Expected frequency}}$$

#### *4.2.3.6 Stage III, Step 1 – Coding raw information*

The primary analyst applied the codes to the full set of interview transcripts, using NVivo software. The full set of interview transcripts was entered into NVivo, including the initial transcripts used for code development. NVivo software was used to apply codes to sections of the transcripts, indicating where themes were present.

#### *4.2.3.7 Stage III, Step 3 – Interpreting the results*

The primary analyst noted and described salient themes from the analysis that were commonly mentioned across the participant sample and interpreted these in light of the nature of posttraumatic growth described in the existing research. Given the number of participants in the sample (99), where a theme was mentioned by fewer than 15 participants it was not deemed common enough to describe as a major theme. The number 15 was chosen because there were some themes that became apparent that had previously been mentioned in the literature and, even if not mentioned very much in the current study, they were explored. Acknowledgement of hardship and distress were pertinent to describe, as it has been found that higher peritraumatic distress and higher perceived stress of an event relates to higher posttraumatic growth. Further, it was important to verify that participants did acknowledge difficulties as well as benefits of their experiences, in lieu of reporting solely positive outcomes and suggesting denial of hardship. Positive appraisal was of further interest, because of the association of optimistic traits and posttraumatic growth.

#### *4.2.3.8 Analysis of gender differences*

Existing research shows that women generally report higher levels of posttraumatic growth than men. Women have also been noted to find life events more stressful and are more likely to be diagnosed with posttraumatic stress disorder after a trauma. Study 1 found gender differences in reported experience of distress from exposure to stressful life events and differing levels of expressed posttraumatic growth. In Study 2, the gender of participants was not given consideration during the initial coding of themes; rather, gender differences were explored as post hoc analyses. In order to explore gender differences in themes, the sample was divided according to gender, and themes examined in the two subsamples. To do this, data on gender were imported into the NVivo software used for thematic analysis, and attached to each transcript. Rates of themes according to gender were generated by NVivo; these were examined for differences in the frequency of theme occurrence according to gender. Such mixed-methods approaches to data analysis are described by Driscoll, Appiah-Yeboah, Salib, and Rupert (2007). Where a qualitative data set is large enough, it is possible to statistically compare occurrences of themes according to defining features, such as gender.

In order to examine whether women and men were more or less likely to refer to particular themes, data were exported from NVivo. Themes included improvement, positive appraisal, hardship for self and others, strong emotion, uncertainty, burden, role to play, and life philosophies.

Where a theme was widely mentioned, power analysis was conducted for the men and women describing a theme, to ascertain whether statistical analysis would yield meaningful inferential statistics for chi-square tests of independence and *t* tests.

Whether themes were present or absent in males and females were then tested using  $2 \times 2$  chi-square tests for independence, in order to ascertain whether either gender was significantly more likely to refer to a theme.

For themes with enough statistical power, data were then exported from NVivo for each theme that had showed initial gender differences in the chi-square tests. Data were the percentage of each participant's interview that was coded as a certain theme, and the gender of each participant. Distributions of the theme coverage for each gender were then examined. Where distribution of theme coverage was normally distributed for each gender, *t* tests were used to compare the average proportion of talk that women spent describing a theme to the average proportion of talk that men spent describing that theme. Where distributions were non-normal, mean theme coverage for each gender was compared using Mann–Whitney *U* tests.

### **4.3 The thematic analysis process applied to the current study**

#### ***4.3.1 Procedure for developing the initial coding system***

A subset of transcripts was examined for themes. Examination of 10 transcripts provided a range of themes, and analysis of an additional five transcripts provided few new themes. Thus, summaries of each theme identified in the subset of 15 transcripts were entered into a table, under three headings: a) description of their experience during and since the earthquake sequence; b) participants' responses to events; and c) posttraumatic growth.

Themes related to posttraumatic growth included those describing greater appreciation of life; new possibilities available because of the earthquakes; changes or solidification of spiritual beliefs; greater sense of community; improvement in relationships; increased personal strength, capability, and compassion; viewing the earthquake as an opportunity for growth and positive change; and modified views of the world. Each theme was then recorded on a paper slip, and the paper slips were grouped according to similarities among the themes.

The process of grouping data according to common themes allowed the creation of codes to summarise each theme. A code consisted of a sentence description of the theme and some examples of each theme. For example, the code 'lucky compared to others' was used to describe pieces of talk that described participants' experiences as fortunate in direct comparison to others who were less fortunate.

For example, C104 responded to a question from the interviewer.

I: You noticed that you are looking at things in a different way, I got a bit of a hint of that with your different approach to life and not sweating the small stuff, have you found any meaning?

C104: Not particularly, but probably just an awareness that I was luckier than some and that it's probably a good opportunity to just think 'life's not too bad', and to appreciate what I've got.

The part of text referring to the awareness of being 'luckier than some' was coded as 'lucky compared to others'.

Similar codes were grouped together and used to draw a diagram of the themes present in the data. Analysts then discussed the diagram of themes. The other analysts

gave feedback about whether the primary analyst had missed themes, or whether further aspects of themes needed to be considered. The diagram of themes was modified until a consensus was reached that the essence of each theme was captured.

A list of the codes was created, with a description of each and information about when to apply a code to a section of transcript and when to use another code. For example, there were two separate codes for participants describing experiencing emotion. The first code was used when the participant reported the experience of emotion, without expressing the acceptance of the experience. The second code represented a participant describing acceptance of experiencing an emotion such as anger or grief. These definitions used inclusion and exclusion criteria – for example, ‘Do not code as *connected to community* if the individual refers only to relationships with family’. Themes were written so that they could be applied to the remaining interview material, and to minimize exclusions.

In order to ascertain whether the codes would generalise to represent themes appearing across the full data set, two analysts then applied these codes to independently analyse a further five transcripts. The codes were reviewed to ensure independent coders could apply the codes consistently. Codes were modified to broadly capture transcript themes with a code description. To ensure the modified codes captured themes in the transcripts so far, three of the analysed transcripts were randomly selected and separately re-analysed and coded with the modified themes. Reviewed codes were then discussed and further amendments made.

At this stage, both analysts were satisfied that coding was generally consistent. The primary analyst then used the codes to analyse the full set of 99 transcripts.

#### ***4.3.2 Process for revising the coding structure***

To review the codes and coding structure once more, two secondary analysts separately re-coded two of the previously analysed transcripts and coded one further new transcript from the data set, unread by either analyst at that time. All analysts met and reviewed the transcripts and their analysis once more, and found that each analyst had coded some parts of text with similar but different codes. This gave rise to a revision of codes and consideration of amalgamating codes with fine-grained differences into wider, more expansive, parsimonious codes.



On examining the similar codes each analyst had been using, some could be merged to be more inclusive, as they represented similar concepts and fell under the same category. For example, ‘accept uncertainty’ and ‘acknowledge hardship due to uncertainty’ became one code: ‘uncertainty’, as both captured the theme of uncertainty, and both fell under the category of appraisal.

At this stage, 101 codes were identified. These fit under the larger themes: taking action, appraisal, and sense of self. The structure of the codes at this stage is outlined below in Table 6. Larger themes are placed at the left of the table and subthemes are indented beneath.

Table 6

*First structure of the coding system*

Theme	Subtheme	Smaller themes contributing to subthemes
<b>Taking action</b>	<b>Taking stock of situation / Weigh up information</b>	
	<b>Carry on</b>	
	<b>Take action / Do stuff / Make effort</b>	
	<b>Doing stuff because it needs done</b>	
		Find information
		Go home
		Clean up
	<b>Doing stuff with others</b>	
		Check on others / Check in with others
		Help others
		Comforting / calming others
		Spend time with others
		Protecting others
		Taking charge
	<b>Operating on autopilot</b>	

	<b>Modelling certain behaviour / response</b>	<p>Making a game of the situation</p> <p>Acting calm</p>
<b>Appraisal: Process of appraising the situation / Cognitive / Way of thinking</b>	<p><b>Acknowledge an extraordinary event</b></p> <p><b>Acknowledge hardship</b></p> <p><b>Acknowledge uncertainty</b></p> <p><b>Acceptance</b></p>	<p>Acknowledge hardship for self</p> <p>Acknowledge hardship for others</p> <p>Experience strong emotion or shock / Physiological effects</p> <p>‘It is what it is’</p> <p>Accepting self/not judging</p> <p>Accepting emotion</p> <p><i>Grief and loss</i></p>

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*Anger*

**Live in the moment**

**Habituate / Get used to it**

**Normalising your experience**

**Optimistic / Positive appraisal**

Appreciate others' input

Count your blessings / Appreciate what you have

Don't worry about what you can't control. Identify what you can / can't control

Downplay the negative / Acknowledging, but not dwelling on the negative

Expecting things will be alright / Not worrying

Expecting others will be ok

Feeling safe

Gratitude

Joy and wonder

Lucky compared to others

Lucky compared to what might have been

Lucky compared with past experiences

Not traumatised

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See humour / irony

View loss / change (city, community, home, work, etc) as positive

*Seeing as fun / exciting / adventure / interesting / beautiful*

*Better off than before*

*See opportunities*

*Committed to Chch / Chch is where I want to be*

*Learn from experiences / Use hard times to grow*

**Modify views about the world**

**Prioritise your time and energy**

**according to what you value /**

**Decide to let things go / Don't**

**worry about 'stuff'**

**Trust own judgement**

**Take responsibility seriously**

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**Sense of self: Perceiving self**

**in a certain way**

**Being aware of own process**

Growth

*Spiritual change or solidification*

*No spiritual change*

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*Appreciate the present more, carpe diem, don't worry about  
the future as much*

*Appreciate what you have more, value people more*

*Greater sense of community*

*Not a greater sense of community*

*Loss of community*

*Better relationships*

*Identify new roles or relationships created because of the  
earthquake*

*Self as stronger, more capable*

Knowing what you need

*Clean up*

*Connect with nature*

*Connect with others*

*Creative expression*

*Writing*

*Downsize*

*Exercise*

*Faith / Philosophy*

*Familiar stuff*

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*Find information*

*Get out of Chch*

*'Home'*

*Keep busy, work, carry on, do stuff to respond to needs*

*Look for the positive aspects in situation*

*A plan*

*Self-care. Look after yourself*

Use alcohol to relax

Safety behaviour

Self-care activities (meditation, eating well)

**Positively appraising self: Positive  
appraisal of how I (usually)  
am / Personality / Capabilities  
/ Self-knowledge**

Adaptable

Calm

Capable

Curious

Optimistic

Practical

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**Positively appraising of how I acted  
in this situation**

Proud

Surprised

**Role: Having a role to play**

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### ***4.3.3 Reviewing pieces of talk within each code***

In order to examine how codes had been applied and the appropriateness of the definition of each code, the primary analyst and a second analyst, experienced in the use of thematic analysis, reviewed all pieces of talk that had been allocated to a certain code. This process allowed analysts to examine the cohesiveness of a code: whether its definition applied to all pieces of talk and whether the definition needed to be expanded. Some pieces of talk appeared not to fit as well under one code as they might another. The two analysts reached consensus about reallocating these pieces of talk to a more fitting code.

Second, it appeared that, conceptually, 'Appraisal' included not only objective appraisal of events, but positive appraisal of events and also of the self. In this context, the third category of 'Sense of self' appeared to fit under the category 'Appraisal', as individuals were necessarily appraising themselves to express this self-knowledge. It had also become apparent that appraisal was often intertwined with the process of taking action; participants described their actions in the context of their appraisal of a situation (e.g., 'The bridge was out of action, so we went round another way to get home'). As this became clear, the primary analyst and a second analyst began to consider different possible ways to group the current themes. Each theme was written on a small sticky piece of paper and laid out on a large table. Some themes were grouped according to different aspects of positive appraisal, such as positive view of the future, positive view of events, positive view of others, and positive view of self. Some facets of appraisal did not fall under positive appraisal, but rather objective description of events, of necessary actions, and of things an individual identified they needed in order to cope with the circumstances.

In this way it was apparent that themes identified fell into positions along a continuum representing the valence of the appraisal: from improvement of self or situation; to positive appraisal of self, others, or situation; description of the absence of negative elements ('I wasn't scared' or 'I wasn't traumatised'); dispassionate description of events and actions; and a sense of burden related to the earthquakes. The code 'Learning from experience / using hard times to grow' could be divided into three: a) having learned from an earthquake experience what one might need for another earthquake (under 'that's how things are'); b) reporting prior experiences as useful for coping with current stressors (under optimistic, positive appraisal); and c) viewing

trauma as an opportunity for growth ('life philosophy', under 'that's how things are'). The theme 'Acknowledging hardship' included mostly neutral descriptions of situations, such as not having access to power and water; a number of these represented 'Burden', where participants described struggling with their circumstances and used words such as 'awful', 'horrific', and 'terrifying'. The primary analyst developed a revised coding structure reflecting these valanced groups of codes.

The primary analyst then met with a third analyst experienced with thematic analysis but new to the modified coding structure. The analysts discussed the structure of the coding system and the third analyst gave feedback on the extent to which the themes formed conceptual groups. The primary analyst and the second and third analysts then used the modified coding structure to analyse a new transcript. They then met to discuss analyses and use of codes. Where there were differences in coding decisions, each analyst explained their reasoning for choosing a certain code for a piece of text. The primary analyst noted that, where analysts used different codes, often the case was that different aspects of a higher-level theme were being noticed.

For example, participant C184 described their experience of the earthquake in June 2012.

C184: I happened to be walking in the park when the first aftershock came through and it threw me to one side and I thought 'That's a big bugger'.

Under the higher-level theme 'That's just the way things are' (dispassionate, neutral description of a situation or event), one analyst used the code 'Taking stock of a situation' to capture the participant processing what was happening around them. Another analyst used the code 'Acknowledge an extraordinary event' to capture the fact that it is not very often that one is thrown to one side by an earthquake. It was suggested that both codes could apply to this text, and that the difference in coding did not impact on the interpretation of the text; both codes described the event and the participant's reaction to it in a neutral manner (i.e., this text does not fit into a theme of positive appraisal or sense of burden). Analysts agreed that as long as the higher level codes were in agreement, the qualitative essence of the text was retained. Where coding was consistent at the level of the higher node, coding could be considered to be agreed upon between coders.

In the course of examining how themes fit together under themes of positive to negative valence, some were moved. 'Knowing what you need' provided a better fit under 'optimistic, positive appraisal', as the text coded to this theme entailed which activities or cognitive strategies were perceived to be helpful for participants after the earthquakes. Others themes that were endorsed by very few participants were merged with other themes. The theme 'New roles or relationships created by the earthquakes' was merged with 'Better relationships' (new friendships) or 'Better off than before' (new jobs).

At this stage it was also apparent that one theme under 'That's just the way things are' was independent from the continuum of appraisal valences. 'Role to play' did not fit into one mode of appraisal (positive or neutral), but contained aspects of each of these. Role was at times described as dictating actions (neutral valence), entailing a sense of responsibility, and at other times was expressed as valued for the participant's coping and as useful for helping others (positive valence). Because these descriptions often overlapped, it was decided to keep the theme of 'Role to play' as a single theme under 'That's how it is', for simplicity of coding; it seemed counterproductive to separate positive and neutral descriptions of a role where they were often overlapping and appeared to fit better as a single theme.

Although not split according to valence, one other set of themes appeared to be a distinct part of the 'That's just the way things are' theme. Participants described their own life philosophies and approaches that helped them cope; for example, the theme of 'Don't worry about what you can't control' and the theme of acceptance ('It is what it is') entailed statements illustrating philosophies about useful ways of reacting to difficult circumstances.

For example, one participant reported the following.

C184: You go through an artillery strike, I felt reasonable about it, I don't like them but I thought 'What will be will be', I can't control them.

Thus, the themes of 'Role to play' and life philosophies such as 'Don't worry about what you can't control' and 'Live in the moment' appeared to be distinct themes under the theme 'That's just the way things are', and were of interest for more in-depth description and interpretation at a later stage. Themes regarding learning from experience were divided according to valence and could be described separately or

together as aspects of the same concept. The final revised structure of the coding system is outlined in Table 7. Indented themes indicate that they fall under the theme above.

Table 7

*Final structure of coding system*

Theme	Subtheme
<b>Improvement, better than before</b>	<p>Appreciate the present more, appreciate what you have more, don't worry about the future</p> <p>Better off than before (financially, physically)</p> <p>Better relationships</p> <p>Greater sense of community</p> <p>Self as stronger, more capable, more compassionate</p> <p>Spiritual change or solidification</p>
<b>Optimistic, positive appraisal</b>	<p>Appreciate others' input</p> <p>Committed to Christchurch</p> <p>Count your blessings</p> <p>Lucky compared to others</p> <p>Lucky compared to what might have been</p> <p>Experiences are useful for learning / I learned from my earthquake experiences</p> <p>Knowing what you need</p> <p><b><i>Subthemes</i></b></p> <p><i>Need a plan</i></p> <p><i>Need creative expression, need to record experience (music or writing)</i></p> <p><i>Need to downsize</i></p> <p><i>Need to exercise</i></p> <p><i>Need faith, philosophy</i></p> <p><i>Need familiar stuff</i></p> <p><i>Need 'home'</i></p> <p><i>Need others</i></p> <p><i>Need self-care</i></p> <p><i>Need to clean up</i></p>

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	<i>Need to connect with nature</i>
	<i>Need to find information</i>
	<i>Need to get out of Christchurch for a break</i>
	<i>Need to keep busy, work, carry on, do stuff to respond to needs</i>
	<i>Need to look for the positive aspects in situation</i>
	Prior experiences as good for coping ability in the earthquakes
	Positively appraising actions
	<b><i>Subthemes</i></b>
	<i>Proud</i>
	<i>Surprised</i>
	Positively appraising self
	<b><i>Subthemes</i></b>
	<i>Adaptable</i>
	<i>Calm</i>
	<i>Capable</i>
	<i>Curious</i>
	<i>Optimistic</i>
	<i>Practical</i>
	See humour or irony
	See opportunities for Christchurch and oneself
	View circumstances as fun, exciting, interesting, an adventure
<b>Not bad</b>	
	Downplay the negative
	Expect things and others will be alright
	Not traumatised
<b>‘That’s just the way things are’ (a neutral description of events and responses)</b>	
	Acknowledge an extraordinary event
	Acknowledge hardship

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***Subthemes***

*Acknowledge hardship for others*

*Acknowledge hardship for self*

*Experience strong emotion or shock*

Acknowledge uncertainty

Change to alcohol use

Doing stuff because it needs done

***Subthemes***

*Clean up*

*Do stuff with others*

Check on others

Comfort or calm others

Help others

Protect others

Spend time with others

Take charge

*Find information*

*Go home*

Just do it, carry on

Modelling behaviour

***Subthemes***

*Acting calm*

*Making a game of the situation*

Take action, do stuff, make effort

Life philosophies

***Subthemes***

*Prioritise actions according to values*

*Don't worry about what you can't control*

*It is what it is*

Loss of community

Modify views

Operating on autopilot

No spiritual change

Normalise your experience

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	No greater connectedness to community
	Role to play, take responsibility seriously
	Stopping or reducing safety behaviours
	Taking stock of situation, deciding what to do
	Trust own judgment
<b>Burden</b>	
	Burden, struggle, stress, awfulness of situation
	Safety behaviour

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#### **4.3.4 Inter-rater reliability**

Values for Cohen's kappa ranged from 0.58 to 0.77, showing moderate to good inter-rater reliability (two of the 10 transcripts showed moderate inter-rater reliability and eight transcripts showed good inter-rater reliability). Frequency of agreement on theme classification ranged from 76% agreement to 85% agreement.

#### **4.4 Final results from thematic analysis: Description of themes**

Participants' descriptions of their experiences and their perception of posttraumatic growth showed the following themes, shown in Figure 5: improvement compared with before the earthquakes, positive appraisal of events, 'That's just the way things are' (a neutral description of events), 'Not bad' (a lack of negative impact from the earthquakes), a sense of burden due to the earthquakes, the importance of role, and life philosophies.



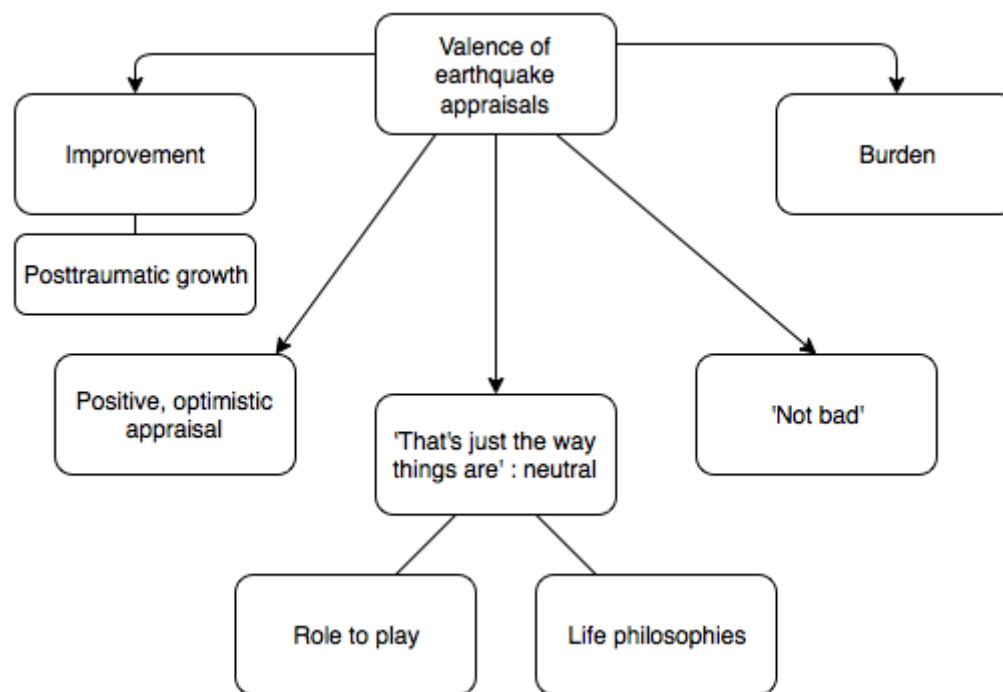


Figure 5: Themes of earthquake appraisals according to value

Posttraumatic growth was expressed as the themes ‘Better relationships’, ‘Greater sense of community’, ‘Self as stronger’, ‘Appreciate the present more’, and ‘Spiritual change’ (underlined in Figure 6). Posttraumatic growth fell under the theme ‘Improvement’, as the construct of posttraumatic growth indicates positive change after trauma. Several other subthemes under ‘Positive, optimistic appraisal’, ‘That’s just the way things are’, and ‘Not bad’ were linked to experiences of posttraumatic growth. These themes included ‘Positive, optimistic appraisal’ (of circumstances, the self, and others), ‘Role to play’, ‘Acknowledge hardship for self’, ‘Acknowledge hardship for others’, ‘Life philosophies’, ‘Knowing what you need’, and ‘Not bad’. These themes are linked to related posttraumatic growth themes in Figure 6.

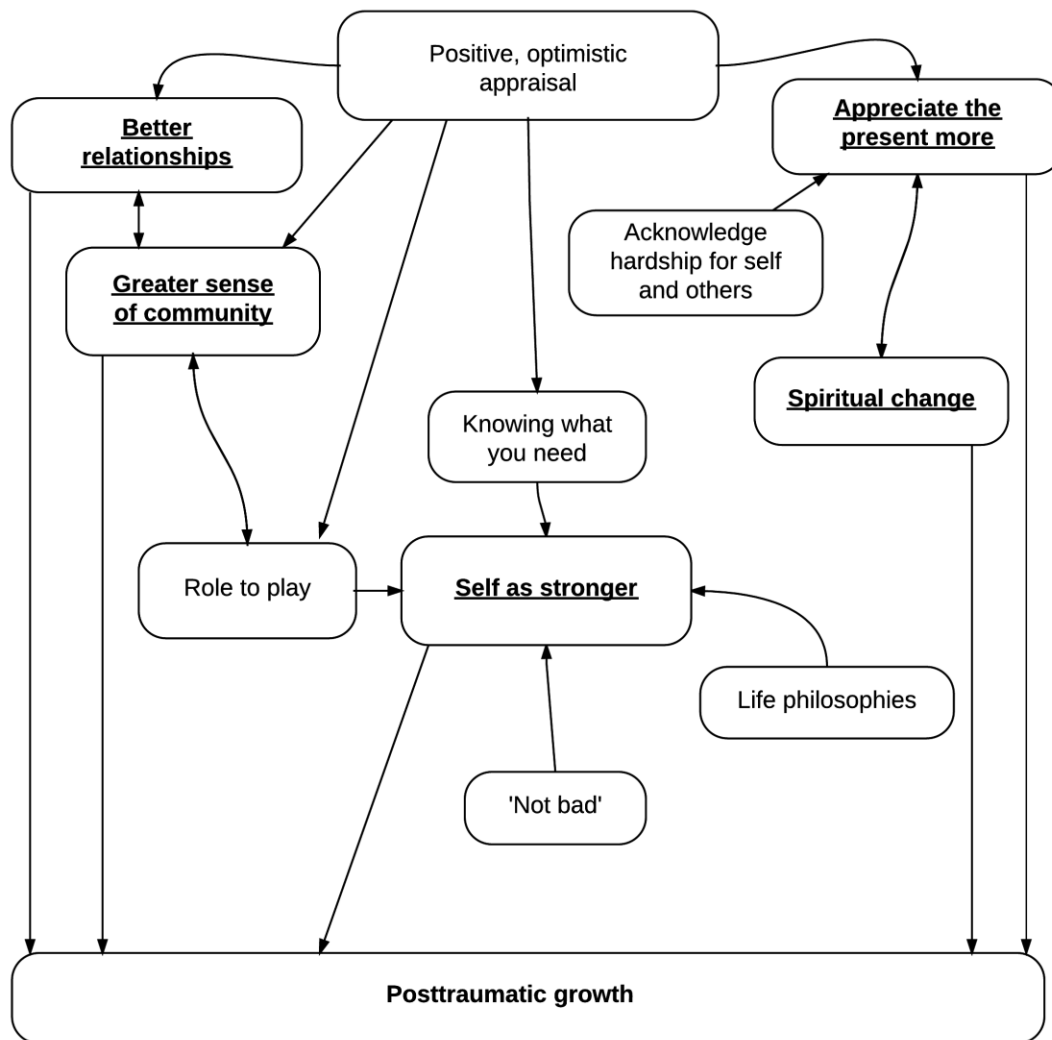


Figure 6: Themes of posttraumatic growth (underlined) and associated themes in interviews with resilient individuals after the Canterbury earthquake sequence

Current models of posttraumatic growth do not outline how mechanisms such as positive appraisal, role, and acknowledging hardship might work to produce different aspects of posttraumatic growth. Exploration of these themes provides further insight into the posttraumatic growth process, which can add to existing models of posttraumatic growth.

In the next section, tables are used to highlight the number of participants endorsing a theme and to show the percentage of each subtheme's contribution to the larger theme. Percentages were calculated using the number of words coded for each subtheme and dividing this number by the total number of words coded to the overall theme. It is important to note that the percentage contribution for each theme does not always add to the total 100% for the entire larger theme. This is because a) smaller

themes mentioned by fewer than 15 participants are not described, b) themes not indicated by participants as pertinent to posttraumatic growth and not indicated by research or theory to relate to posttraumatic growth are excluded, and c) at times, text was coded for two themes where two themes applied. For example, where a participant was appreciative of living in New Zealand rather than Haiti, because of the excellent emergency response in New Zealand, this was coded as ‘Appreciate others’ input’ and as ‘Lucky compared to others’.

To give context to the themes of posttraumatic growth and related themes, themes that fall under the broader theme ‘That’s just the way things are’ (a neutral description of events and responses) will be described first. Frequencies of subthemes under 'That's just the way things are' are outlined in Table 8.

#### ***4.4.1 ‘That’s just the way things are’ (a neutral description of events and responses)***

Table 8

*Frequency of subthemes in ‘That’s just the way things are’.*

<b>Subtheme</b>	<b>Number of participants reporting theme</b>	<b>Percentage of larger theme</b>
Acknowledge hardship for self	98	36%
Acknowledge hardship for others	89	16%
Experience strong emotion or shock	85	15%
Acknowledge an extraordinary event	61	7%
Uncertainty	51	5%

#### *4.4.1.1 Acknowledge hardship for self*

Ninety-eight participants described some degree of hardship associated with the earthquakes. This reflects participants acknowledging the negative as well as positive aspects of a situation and is an example of the kind of balanced appraisal found in other studies to contribute to the process of posttraumatic growth (Pals & McAdams, 2004). Such an honest appraisal of positive and negative elements of adversity can be included in current models of posttraumatic growth as an aspect of reflection that influences the posttraumatic growth process.

Difficult experiences during the earthquakes were common, such as observing destruction and injured people. Difficulties occurred on one's path home because of damaged infrastructure, ongoing aftershocks and liquefaction, and discovering one's home was damaged or destroyed. Services were unavailable, rendering many participants without water, electricity, or sewerage services. Cell phone networks were overloaded, resulting in problems and delays contacting loved ones. Subsequent hardships were widely described with disruption to one's work and home, problems repairing houses, and ongoing uncertainty about when and whether one's property would be repaired, rebuilt, or deemed unliveable. Some suffered financially because of loss of work, increased costs of new living circumstances, or spending money on repairs. Some lost friends or family members because of death or moving away from Christchurch; many reported loss of their communities when properties were 'red-zoned' (land deemed unsafe) or houses 'red-stickered' (house deemed unsafe). Frustration was widespread in communicating with insurance companies and the EQC (responsible for assessing the damage to property, the safety of living on property, and costs for repairs or rebuilding). Many described poorer concentration, interrupted sleep, and impaired memory, referred to by some as 'earthquake brain'. Repeated earthquakes and ongoing aftershocks were described by some as tedious and frustrating, creating more work for individuals professionally and personally. Aftershocks contributed to an underlying sense of tension, awareness of surroundings and risks, and an increased startle response to aftershocks. Finally, some participants described the behaviour and attitudes of others as challenging or difficult.

Commonly, participants reported being ‘sick of’ the ongoing aftershocks, frustrated by the continuing repercussions from the earthquakes, such as arranging repairs and communicating with agencies, and annoyed by reminders of the earthquakes from media.

C153: I’m sick of not having a house, sick of insurance companies, sick of not knowing.

Widely, damage to homes and possessions was described, rendering some houses unliveable and others needing repair. Houses were at times challenging to access, affected by liquefaction, or unsafe to stay in.

C166: The most significant one for us was September because we lost our home, it was completely written off. I don’t recall the earthquake itself as being particularly traumatic.

Subsequent house moving was described by some as stressful. Some moved many times after the earthquakes because of difficulty finding appropriate affordable accommodation.

C109: When you’re a young student you move around a lot eh, like I was thinking this is ridiculous [participant’s name], when you’re a student you move around a lot and you change flats a lot and it’s all fun and exciting and you just move if you don’t like it, but this isn’t like that, it’s quite different.

Some grieved friends or family who passed away in the earthquakes; some were saddened by the widespread loss of life.

C163: The thing that was most problematic about the February earthquake is that our friend died... We were probably her husband’s main supports, apart from his family, when she died, so there was all that trauma of helping him look for her... Supporting him over the last two years had been pretty tough.

Many participants did not have access to services such as water, electricity, and sewerage. Cell phone services were overloaded and patchy. The duration of service outages varied across participants, and they described measures taken to function without these services.

C147: [We managed reasonably using a makeshift toilet in our garden], because the thing is I always think how much space you have and our property was a big property, which makes a difference. It's really different if you live close to each other and we [have a] big house and our garden set up, so to speak, with these little toilets. It wasn't too bad you know, we had a roof on top and it was all possible and it didn't feel yucky because it was your own home and you could do it like the Scouts would do it. We had no water, I can't recall for how long, four weeks. No electricity, the electricity came back first, but it probably took a week. The problem was that all our other houses were in the same area, they were either [in a subusrb] or city, and they had been badly hit and it was very difficult to get to them, often they had no water either.

Disruption to work was very common; some lost premises, customers, businesses, or work hours. Many had to work and function without the resources necessary to support their roles. Additionally, financial difficulties stemmed from costs of housing repairs or rebuilding, or loss of income. These financial pressures often intensified the difficulty of responding to challenging circumstances brought about by the earthquakes.

C155: I've gone from having significant assets to now having significant debts, which I've never had before in my life, I've been in business for most of my adult life, and never owed anyone a cent, so that's personally for me a real challenge that I've left significant debts unpaid.

Some participants referred to sleep deprivation as a result of ongoing aftershocks and adrenaline surges that they experienced in response to these. Others referred to their difficulty concentrating and poor memory; some referred to these effects as earthquake brain. Fatigue was commonly described as an effect of both experiencing the aftershocks, and taking on the resulting work that demanded attention after the earthquakes.

C164: So the sleep deprivation as well because of these aftershocks continuing on happening and being woken up in the middle of the night and getting tired because of having this repeated disturbed sleep. You would feel an earthquake and think 'Don't need to get out of bed, this is going to be a small one, this is going to be a large one', and having that

adrenaline surge every time something happened and whether you need to respond to it or not. Along with that, the earthquake brain where you experience for quite a while, it was hard to focus or to remember things; I had to write stuff down. With work it was a lot harder, then it settled down.

Widely, the actions or behaviours of others were identified as problematic or upsetting. Relationships were under pressure in families and partnerships, and between members of the Christchurch community. At times this pressure resulted in irritability and poor treatment from others, whether intentional or unintentional. Those in different situations appeared to lack understanding or empathy with the difficulties of others. Additionally, some antisocial behaviour such as burglarising was frustrating for many.

C109: I'll give you an example...because some people quickly want to – when you've lost your house, ... I mean I'd lived there for 30 years and I just loved it. It was just so incredibly great. It was a neat place, [beach suburb], and I did know that, I always knew how lucky I was to live there. But people get, I mean, and I only want to hear that so many times is how quickly they want you to move on to something. 'But you're getting a new house'. Never in my life have I ever woken up and thought, I'd love a new house. And other people who've lost their houses – this is a sort-of in-group complaint, 'But we're getting a new house'.

Communicating with EQC and insurance companies about house and land assessments, payments, repairs, and rebuilding was commonly cited as one of the more stressful elements of overall earthquake experiences. Some referred to dealing with EQC as more traumatic than experiencing the earthquakes themselves.

C192: I think the biggest thing has been the insurance company. The absolute hell they have put us all through, and changing their minds, and different project managers and just being so difficult. Personally I have been OK with EQC, I haven't had any hassles but I know a lot of people have, but the insurance company are just, trying to get what you are entitled to, dealing with their lies, they tell blatant lies.

The loss of community was aggrieving to many, both losing the buildings and also members of the community with whom they had built relationships. Furthermore, damage to city itself was reported as upsetting by many, losing places and buildings that were home to happy memories, and losing the capacity to be the scene of vibrancy and new memories.

C188: My biggest issue with earthquakes is what it's done to the city. I've lived in Christchurch most of my life, and it seemed to be coming into its own, settling down into a really nice lifestyle city, fashionable and there was lots of activity and life. I wasn't a part of that but it was nice to see that the city had life and it was continuing to improve, and to see that all disappear. It all stopped and slowly the city has been disappearing, buildings are gone and the life has gone.

To summarise the theme 'Acknowledge hardship for self': many experienced a range of hardships during and after the earthquakes; these hardships posed challenges, demanded responses, and were acknowledged as a reality alongside other positive outcomes from earthquake experiences.

#### *4.4.1.2 Acknowledge hardship for others*

Eighty-nine participants displayed an awareness of the suffering of those around them, often contextualising their own situations in comparison. This is likely to be another element of cognitively appraising and processing one's experience with trauma that can be included in models of the posttraumatic growth process. Awareness of others' difficulties was at times an instigator to act to help in some way or meet others' needs. Other instances saw bonding with others over shared suffering, or realisation of the possibility that similar hardship might have been inflicted on the individual as occurred to others. This will be further discussed in 'Lucky compared to others'.

First, an awareness of the nature of others' experiences was demonstrated. Participants acknowledged others' emotional distress and the hardships occurring to others. Often this contributed to a sense of the magnitude of the earthquakes as an exceptional experience.

C118: The butcher's shop was about two foot high and fish shop next door and the butcher was standing out and he said 'That's my shop' and



this was the second move because in September he had to move his premises and he said his car was behind and that was squashed and he said the fish shop next door, the lady in there was killed and that was the first thing I thought, 'My god, there has been someone killed', and I knew her because I used to buy my fish from her and he said that lady plus a customer had both been killed, and that made me stop and think a bit.

C171: [I] went to school and parked at the end of the road, and met another woman with a son in my daughter's class and she was crying. You just remember people's panic.

Widely, many were triggered to act in response to others' distress, comforting, helping, rescuing, and acting to alleviate suffering.

C110: [The earthquake] upset the neighbours quite a bit so I spent a bit of time standing around talking to them and had to go into the house next door with the lady because she was too scared to go in by herself, all the ornaments were everywhere.

C156: I also feel responsible for my landlady, she will be seventy in a couple of months, she was scared to death really, she was shaking like a leaf in the wind, so I feel a bit responsible. I just passed on my knowledge of survival skills; I've done survival training in the Army. I know subconsciously there is comfort in doing those things, but I didn't think of it consciously, to me it was more means of preparing, getting ready. Because by then we knew it isn't going to be over any time soon, we had better get ready.

Many mentioned others' suffering alongside their own. This gave a shared context to suffering. Bonding and solidarity was described over this shared suffering.

C124: I think it's robbed me of a good two years of my life as far as we were sitting in a nice house, our children were older, everything was looking really good, and then instead of sitting there and looking pretty for two years we have had to do all this moving and lose all our stuff. But I've also been unfortunate to live next door to a lady who lost her son from the earthquake and when I look at her I think it's nothing compared

to what she has lost. She lost her son in the wrong order, you should die before your children, and I watched her and they are never getting over it, and her husband grieves in a different way than she does, so that's problematic, but to me I think she needed a plan. She was talking to me and [my husband] all the time; I think because we worked in health we could be sympathetic, some of her friends were afraid to talk to her. On Mother's Day I took her some flowers whereas on Mother's Day most people avoided her. So I think that's been good for us and I think it's been good for her, and she was sympathetic to our situation.

Many described empathy and compassion in response to the suffering of others, or being distressed by others' distress.

C122: We hid under a doorway while we waited for everything to finish and then I felt compassion for some of the kids who were outside crying. I gave a few hugs and then we had to try and group ourselves together and it was quite a while before everything stopped happening... It was amazing and I found it very distressing to watch the tsunami [in Japan] on TV, I found that really distressing to watch and I now find...I'm far more compassionate about other people that have disasters because really it's not until you have been in something that you really understand just how devastating [it is].

C201: [Some people] are aggressive to the name [of the company I work for] because of the experiences that they have gone through. So when I go in to see people I treat people very much with care and with dignity because I know that what they have been through is very important to them and can be very stressful. It doesn't work all the time, but most of the time it does.

To summarise the theme 'Acknowledge hardship for others': participants described the distress and hardship of others, and this triggered helping and comforting others. Through acknowledging and responding to others, empathy and closeness to others was experienced. Further, an awareness of relative personal fortune was described; this is outlined in depth in the 'Lucky compared to others' under 'Optimistic, positive appraisal' themes. Many compared themselves to others in distress and described

gratitude that they had not suffered in similar ways, in spite of having their own struggles.

#### *4.4.1.3 Experience strong emotion or shock*

Eighty-five participants described strong emotions such as fear at the time of the earthquakes, or sadness and grief regarding loss of life or the city. Many reported shock: being in shock or feeling dazed. Such strong emotion and shock is accounted for in models of posttraumatic growth in the immediate distress after a trauma.

C178: So we dived under the pool table. It was like excitement/fear rolled into one and it is quite hard to describe the right word.

C196: Only two where I thought we might die, that was the February quake because that was super violent, and that, actually the February one was the only one where I feared death at that time.

I: That went through your head?

C196: Yes, I was under my desk very quickly, I remember seeing lots of feet going back and forth, people were running and there was a little bit of panic. I remember a whole wall of Eastlight folders came down on my desk and then I thought 'I wonder if it's the concrete slab roof or the floor that will go first'.

Shock was described by many, with some reporting being numb or 'in a daze'.

C121: I remember seeing one car and seeing an arm and not actually registering that it was an arm from somebody. There were so many people trying to do things, I was in a bit of a daze, then I remember these men walking towards us in suits and had blood and that was heart breaking because it was surreal seeing these men who usually hold it together were not.

Emotions were described as bubbling, as waves of emotion, as 'emotional liquefaction'. Some reported feeling emotional, 'getting teary' or crying in response to their experiences, feeling very sad or angry.

I: Have you noticed that you're more angry since the earthquakes?

C109: Yes, definitely. My family would say that too. Irritable... Well, I mean, it shakes you up - my daughter said something really interesting.

She said it shakes you up and you don't become as reliable to yourself and that can be, you know, quite scary because you don't want to put people so they'd be irritated or um, sort-of, brusque, or you know, having a bad day. But the people who aren't doing the sort-of bigger earthquake things whose lives are going on as normal don't want to necessarily bear the brunt of that, yeah. And I'm very respectful of that and my way of dealing with that is...just to put a lot of distance and space around me so that if I am worried that I'm feeling very angry that no one else has to.

C184: I felt incredibly sad for Christchurch, and I think I was pretty exhausted at that stage, and I felt quite emotional.

To summarise the theme 'Experience strong emotion or shock': fear, shock, and strong emotion were described as common responses to earthquake experiences. Descriptions of fear and shock could be considered a part of peritraumatic distress. Some descriptions of strong emotion occurred in response to immediate earthquake experiences, and other descriptions of strong emotions were part of the aftermath of the earthquakes, in response to the loss of the city, the ongoing aftershocks, and difficulties rebuilding homes and lives.

#### *4.4.1.4 Acknowledge an extraordinary event*

As participants described their experiences during the earthquake, this theme was expressed by 61 participants and set the scene for participants' perceptions of the earthquakes and their responses to them. This theme saw participants acknowledging that, for them, the events of the earthquakes were extraordinary. It may be that an event perceived as out of the ordinary might shatter pre-existing worldviews, which is similar to the theory that traumas challenge existing worldviews. This possibility needs further research and consideration for including in current models of posttraumatic growth.

Descriptions of feeling as though on a movie set, of the scene being 'surreal', 'incredible', and 'extraordinary' contribute to this theme. The essence of this theme is of an experience quite apart from the everyday experiences of life – an event that many would not usually expect to experience in their lifetime.

C113: You would see the damage on TV and...there was definitely something happening there, I couldn't put a common handle on it, you

definitely felt something, you were seeing history. For a lot of people living through these quakes is similar historical things to the likes of Princess Di being killed, September 11, moon landings, all these very significant historical markers in our lives.

C133: The power was just amazing, we had big front doors and one was ripped off its hinges and thrown sideways through a glass wall, it was just phenomenal power... Apart from the incredible noise, our bedroom was directly below the kitchen and everything in the kitchen ended up on the floor, so there was this incredible smashing and crashing, but also the view that we have taken in a substation... and because all the pylons were swinging around, there was huge arc lighting, the shorting out, just this incredible glow and I was transfixed with that.

#### *4.4.1.5 Uncertainty*

Fifty-one participants described aspects of their experiences as uncertain or uncontrollable. They reported uncertainty about the timing of the ongoing aftershocks, the whereabouts of loved ones, and the fate of their houses. It may be that uncertainty is an aspect of distress that contributes to the ongoing process of posttraumatic growth.

C121: You carry on because you can't change it and that's the hardest thing, whereas with a business if something is failing you can find out what it is, adapt and fix it. If you are unwell you can help yourself get better, a good lifestyle, if you are unfit you can do exercising and bring yourself up to a level of fitness where you feel great, all those things give you an element of choice in what you want to do, but those damn earthquakes, you couldn't, there was absolutely nothing.

Uncertainty and lack of control was challenging for many.

C171: The not knowing [was one of the most difficult aspects of the earthquake]. The media didn't cover the CTV thing that great, in fact one day we were sitting around and they said that some of the crews had got a camera down and they had found twelve people alive in a cavity. So we all got our hopes up that maybe they had all stuck together under an office table, but they reported an hour later that they didn't find anyone alive...

So for four or five days we didn't know whether he was alive or dead under the rubble because they were pulling people out of the PGC building. Then the lift shaft was on fire so we didn't know if he would have got burned or if he was trapped, we were wondering what situation he was in.

Some described an acceptance of unpredictability and uncontrollability.

C109: I've realized that there's quite a gulf between intellectual knowledge and what actually happens. Like, before the earthquakes we thought we had a bit of a handle on atoms and our brains like to make patterns and see kind-of meanings and you know, try and predict things. So I've realized that now that [we] actually don't know very much at all...[The uncertainty doesn't stress me out, it interests me]. Once I've got myself to the point where I now think, well we don't have so many earthquake experts now popping up trying to predict...what's gonna happen. Maybe that's because we've all had our confidence shattered a little bit and the certainty of that. Once you have accepted that, that's actually a freedom because you're not trying to still believe in the patterns.

Uncertainty was a salient aspect of the earthquakes for participants. Some described the uncertainty simply and without appraisal; others described uncertainty and uncontrollability as difficult; some described an acceptance of this uncertainty.

#### **4.4.2 Improvement**

The theme of improvement includes several subthemes describing posttraumatic growth: strengthened relationships and a greater sense of one's own strength, as well as a greater appreciation of life and modified spiritual views. 'Better off than before' describes improvement in circumstances, of being financially or physically better off in some way, and therefore is not considered as posttraumatic growth; however, it is described here to give a broad picture of participants' experiences. Table 9 indicates how widely each theme was described by participants.

Table 9

*Frequency of subthemes in 'improvement'*

Subtheme	Number of participants reporting theme	Percentage of larger theme
Greater sense of community	61	28%
Increased appreciation of life	57	32%
Self as stronger	54	23%
Better relationships	39	20%
Spiritual or philosophical change	17	7%
Better off than before	16	6%

#### *4.4.2.1 Greater sense of community*

The most frequently endorsed theme was a greater sense of community, which has not been found in other qualitative research of posttraumatic growth after other traumatic events. This theme indicates a qualitatively different aspect of posttraumatic growth, likely as a result of the nature of the traumatic event itself: a natural disaster affecting everyone in a city.

Sixty-one participants reported an increased sense of community, closeness to neighbours, and a greater sense of connection with others from Canterbury. Such a theme is related to an aspect of posttraumatic growth in the context of a mass trauma. Also, it is possible that participants who already had good social support and contacts (which contributes to the process of posttraumatic growth) may have had more of an opportunity to build community. In this way, a sense of community both contributes to posttraumatic growth and is an outcome of the posttraumatic growth process.

I: Have you sensed any differences in connectedness to other people?

C112: Yes definitely a greater sense of community...People are friendlier and people in the neighbourhood speak freely to one another. I've lived where I am for three and a half years, I moved to Christchurch from the

country and it did take me a while to get to know people locally, but definitely the earthquake has accelerated that.

Practical and emotional support from neighbours was frequently described alongside an increased sense of community.

I: In general do you think there is a stronger sense of community as a result of the earthquakes?

C130: Very much so. A lot of the people that would go past we would say 'Yoohoo', but they would actually stop and say 'Look, we've been talking for years, my name is...', and this is from people who are a long way away in the Bay from us, so they would actually pull up. I remember I'd just be walking and people would pull up and say 'Oh you live in the Bay, how are you guys doing?', and we would swap telephones, and also some wonderful people... have got access to a water truck and they said we are going to start a water drive, would you like to be delivered [water]?

A perception of Christchurch residents being more patient and forgiving toward each other was often expressed, particularly soon after the earthquakes.

I: I'm wondering if you've noticed any positive effects from the earthquakes?

C151: Yes, I suppose community spirit. I think people are more forgiving of people. If you drive poorly or if you are having a bad day, most people understand that there are a lot of people under stress.

Many described closeness with others from Christchurch because of their shared experience. This contributed to a sense of an 'in-group', where those from the outside were perceived as less able to understand the plight of those who had experienced the earthquakes.

C151: I think Christchurch as a whole is more connected. If you came from Christchurch during that time, no matter where you are in the world, you have that earthquake conversation, guaranteed. My neighbourhood was always quite connected, they were quite an interactive bunch, so maybe it's grown a bit, maybe it's a collective sense of going through this. I gave this lecture in [another town] a couple of months after the earthquake, and there was a guy there and I couldn't believe what he said,



he said ‘Oh, just a few earthquakes, I’d be alright up there, I think I might go up to Christchurch’, I wanted to slap the guy. You can make those kinds of jokes if you are from Christchurch, but you can’t if you aren’t. I think there will always be that unifying kind of sense of camaraderie or something, and the ability to have the black humour around it, but you can’t do it if you are not from Christchurch.

This ‘black humour’ appeared to be part of a sense of connectedness with others from Christchurch.

C166: I’m keeping a sense of humour, sometimes it’s black humour, I definitely have enjoyed a lot of the jokes, just feeling like part of something bigger. Even it’s a dreadful thing it has created a sense of community that wasn’t there before.

Some participants mentioned a short-term increase in community spirit and then a waning of this spirit.

C134: It tended to mask it a little bit because we have got a few people that have come in but initially after the quakes, there was a sense of community, you were looking round at people and you knew that everybody had gone through the same thing, you felt like you were brothers and sisters, you were a family with complete strangers. There were aftershocks and cars stopping in the middle of the road and the intense fear on people’s faces and you feeling that same fear and then looking at the person next to you and actually being able to give that friendly smile or a hug, or whatever it was. That was really incredible stuff and I think it just showed the whole thing about being universally connected which was really wicked, but it sucks down again, that’s just people, their own self-protection. That was positive the way people helped each other, but I think now we are starting to find that kind of thing closing back off, people becoming selfish again.

Those whose housing situations changed commonly attributed a loss of the initial sense of community to moving to new suburbs or buildings, or to losing neighbours who had been ‘red-zoned’.

C115: Where we live now we don't really know the neighbours much, except for direct neighbours and stuff because there has been migration, there have been people moving in and out... so that community thing is lost again because of people moving out.

Others acknowledged this wane in community spirit, and also regarded the initial increase in community spirit as having some lasting effect.

C199: In the immediate aftermath we became close friends and that is dissipating now, you know they are there in a way they weren't before; you have more of a consciousness of community.

Some participants partly attributed a greater sense of community to helping behaviours.

C190: I think you could see people coming together and helping each other and just neighbours helping each other. We live such funny isolated little lives and yet we are a few hundred metres next to each other. So start talking and helping each other and that was amazing.

To summarise, the theme 'Greater sense of community' describes a sense of unity amongst Cantabrians who had experienced the earthquakes. Such a unity was created through mutual hardship, which encouraged neighbours and strangers to help and support each other. Participants reported that soon after the earthquake there was a sense of general understanding among residents of Christchurch, knowing that others were likely experiencing difficulties of some kind. Some described a waning of this sense of community as hardships continued and as communities dispersed. Others acknowledged this waning of community cohesion, but also noted that some of the increased sense of community still remained 2 years after the earthquakes.

#### *4.4.2.2 Increased appreciation of life*

Fifty-seven participants described an increased appreciation of living, of the present moment, and of others. Many described not worrying about the future as much and having more of a 'carpe diem' attitude to life. This was linked to a sense of vulnerability and the fragility of life, and a reprioritisation of values. Some reported this reprioritisation leading to changed behaviour. Additionally, some described a sense of satisfaction or joy from appreciating small elements of daily life more than

they had before. Such increased appreciation of life is a well-acknowledged result of the posttraumatic growth process, and could be captured more descriptively in Calhoun et al.'s (2010) model of posttraumatic growth. For example, recognition of resources or opportunities could be specifically described as increased appreciation of living.

For example, one participant responded to an inquiry about changes since the earthquakes.

C104: Possibly my attitude to some areas that before were more important to me, that now it doesn't matter – we're alive, we're healthy, we've got enough money, the house is holding together, everything else just washes away, don't really care. So the little things that might have irked me beforehand just aren't even on the horizon anymore.

Related to appreciating life more, participants often described a realisation of the fragility of life.

C118: So I do try to enjoy each day. It's probably a bit glib to say that but I'm more aware of the finality of life I suppose, maybe I won't be here tomorrow or in six months, or whatever, for whatever reason, whether it's an earthquake or whether I'm struck down by a bus or I wake up tomorrow with a brain tumour, things like that.

Many described 'living in the moment' more, appreciating the present.

C109: It's made me realise that when you have a really good day, you should just be completely in the really good day. I don't have any sort of 'futuring'. I don't 'future' much now at all. I suppose they will rebuild my house one day, but it's just enough now to be in every day as it is.

A decreased emphasis on possessions was connected to an increased emphasis on people and spending time with people. Many described a shift in priorities.

I: Any changes in the way you look at things?

C150: Yes, I think 'Well we have lost a couple of hundred thousand dollars, got to get over that, move on', so that makes me think more about what's really important in my life. I think it's about relationships I have in my family, not the kind of house we live in or where it is. Those are

always going to be considerations but not the primary ones, so I certainly think about the future in a different way.

Some stopped buying new possessions to replace broken items; others chose to stop buying gifts for each other because they no longer saw a need for 'things'. For others, a desire to make the most of the present manifested in decisions to spend time or money differently, spending more easily because 'you can't take it with you'.

C122: I started spending money more easily, I suppose I've taken up the thought that 'If I want it I may as well have it; I can't necessarily save it forever'. I'm certainly saving because I'm going to have a month this year when I don't think I will have any income, but I suppose I have been a bit more frivolous with my money knowing you can't take it with you!

Others reported re-evaluating their lifestyles, and taking action to change unsatisfactory aspects, for example an increased appreciation of wellbeing resulted in one participant choosing to engage in mindful meditation more regularly to nourish wellbeing.

C204: I'm really trying to consciously do things about wellbeing, like I've started doing some mindfulness regularly, which I would never have done before, and thinking that's really quite beneficial.

In some cases, this increased appreciation related to comparing one's own situation with what happened to others, or to what may have been. This showed a link between acknowledging the hardship of others, to considering oneself lucky, and to a greater appreciation of one's lot in life.

C112: Maybe looking more about what I can do for other people outside my immediate world, strangers or the community. Feeling really grateful, certain things got into my head, a quote kept coming back to me, it was 'I cried because I had no shoes until I saw the man who had no feet', and that seemed so poignant. I deeply thought about it and what it meant, and all the people who were injured. Mostly I haven't come into contact with people who have been badly injured or who have lost people. Felt really sorry for people with liquefaction. Focusing on being grateful and all the things that could have been so much worse and much more slack about replacing things that have broken. We have only replaced the stuff we use

day to day; we think 'What's the point when we haven't got a house'.

Realising how much stuff you have that you really don't need.

Some described a fuller emotional life as a result of their increased appreciation of small things. One participant describes a sense of joy that accompanies an increased appreciation of life.

I: Have you noticed any other positive effects at all?

C166: A sort of celebration and gratitude for a lot of little things. There's a memory that really sticks in my mind of about three months after the February earthquake, we traditionally always buy a big box of fireworks... and keep it until winter. We had a party down [on the beach] and built a big bonfire with some of the demolition of our house which was quite symbolic I guess, and invited all the people we knew in [our neighbourhood] and had sausages and marshmallows and wine. It was very special even for a lot of people because the kids were playing with glow sticks and playing spotlight and just milling on the beach, the adults were standing around and talking in this beautiful setting. We had all walked past collapsed walls and broken pavements and it was quite good because the light was out in [the] bay so because of the damage the fireworks were a lot more dramatic. Just simple things of people getting together to share pleasure, and community, and food, and the outside, celebrating that you can find happiness and peace in the midst of disaster. People endure, and you can do more than endure, you can thrive, you can laugh, and play, and feel at peace with the world in spite of all the devastation around us. That was pretty cool. I still have some of that sense, a huge satisfaction, a real joy.

Along similar lines, one participant described feeling more alive as being more sensitive to their own environment, and experiencing a wider range of emotions.

C109: This is hard to put into words but I do think my emotional menu, like the emotional menu of my life is far bigger now than it was before. I was talking to someone and they said 'I feel as if I was actually sleepwalking before the earthquake, just quite comfortably sleepwalking'. I don't think I was because I was really enjoying a lot of the personal stuff that I do, but I do think my emotional appetite is much bigger

I: Have the earthquakes had any effect on your appreciation of life?

C109: Yeah... on a really nice day, the colours seem brighter, and music seems more special. Food tastes better. Sleep is better. Good sleep!

To summarise the theme 'Increased appreciation of life': participants described a reprioritisation of values in their lives, with a greater value placed on others, health, living, having enough to survive, and day-to-day experiences, such as smelling flowers, taking care of oneself, enjoying food, listening to music, and experiencing emotions. Realising the fragility of life resulted in a greater effort to appreciate the present, invest in people and activities of value, and take opportunities that presented themselves. Conversely, participants culled elements of their lives that they now considered of less worth; possessions were prized less. Appreciation of life was linked to realising that one could easily have lost one's life and to acknowledging that others were often worse off in some ways (described in the theme 'Lucky compared to others').

#### *4.4.2.3 Self as stronger, more confident, capable, and compassionate*

Fifty-four participants reported perceiving new strengths in themselves. Such a change is described in current models of growth, such as Calhoun et al.'s (2010) model. Strengths came in various forms. Participants described an increase in their ability to calmly assess situations, compassion, self-confidence, self-knowledge, adaptability, resilience, acceptance, and ability to let go of things outside their control. Frequently, participants reported a sense of confidence in their own ability and strength, gained from experiencing the earthquakes and discovering that they could cope and act to do what was necessary.

C177: Having all been through that experience together it's something that you share and knowing that you can get through gives you more confidence and knowledge that you can cope with these things, that you aren't ignoring how you would cope with a difficult situation, so it does give you strength and courage.

C190: I think you learn to rely on yourself and you learn that you are a lot braver than you think you are.

A greater ability to calmly assess a situation and make an appropriate response was reported.

C103: I think it's given me a better mental state for planning. Now I find if I feel a shake that I don't panic, I tend to have a look around where I'm going to go, or where I'm going to put my kids, something like that.

Participants noted their own increases in psychological strength, and increases in the strength of others.

C136: I think it's definitely taught me lots of resilience. I was a fairly resilient person before but I think now it's added to that.

C204: I think finding what you can cope with is quite remarkable, what you think you can do and can achieve despite adversity and how you handle that, so it's actually been really quite positive. I'm not super human or anything and recognise vulnerabilities but you can find a way through this, and similarly seeing that in other people. I actually think it's remarkable what people have been through here, if you listed the life stresses that people have been through, and they are still alright and still positive and optimistic or managing. I think the human spirit is remarkable. So that's been really good.

Increased insight into one's own nature was reported by some participants. Earthquake experiences were perceived to reveal aspects of self that participants had previously been unaware of, and that participants could make efforts to adjust. An example of this is described by one participant:

C208: I would say I'm a bit more aware of my limitations. It allows me to compensate for them, to work around them.

I: What sort of things?

C208: Observing how I cope with stress and how I deal with people under stress, I tend to get very short tempered, so I have probably thought about things more in that light and now I'm aware that I'm doing it so don't get mad at people. Being in touch with family just a little bit more frequently.

As a rule, increases in a sense of personal strength gave participants faith in their future coping abilities.

C166: We've all been tested in ways that none of us really expected to be and I feel quite proud of having got through it. I feel like I could cope

with future events, I don't want to at the moment, but I know I have the capacity to go through a lot of changes and a lot of stress without completely losing the plot.

C164: I guess you learned adaptability...When you go through something that is quite big and come out the other side of it and go 'we actually did manage to deal with that', and if you can deal with some of those things you can deal with lots of others as well.

Some participants spoke of a new acceptance of things outside of their control, as an aspect of increased personal strength.

C148: I think that's probably one of the most positive things for me, is learning that there are certain things that you can't change. Sometimes you just have to take it on the chin and move on.

Participants often reported increased self-worth associated with an awareness of capability.

C194: I think in some ways it has made me take stock, and I can remember being told that I don't understand how much skill and knowledge I have, and it has made me take stock and think 'yes you are capable', whereas before I think my self-esteem was not always up there.

Frequently, a greater capacity for compassion was reported because of the knowledge of the hardships others were experiencing.

C185: I feel compassion a little more readily than I used to. I see something like John Campbell's show where he was showing the paper trail of emails he had received when he had asked for both positive and negative stories about how people in Christchurch had been affected...The trail of positive experiences went from here to that door, the trail of negative experiences went out the door, down the corridor, down the stairs and stopped just short of the street, it was hundreds of times longer and you realised just how many people are really hurting.

Some made connections between their increased sense of strength and the perceived reasons for this. One participant linked a sense of strength to their actions – to contributing in what they considered a useful way to the earthquake effort:



C189: Because I felt I was doing something useful it stimulated my brain which had gone to sleep because of this earlier stuff with my partner leaving, but also it gave me a reason for being alert and alive and therefore I could be more useful and therefore I felt stronger in myself.

Increases in skills and interpersonal support were credited for some gains in personal strength.

C122: I certainly feel as though I can handle things a lot better than I could, and I think that's because of the support that I get from other people, and the stuff that I've learned to be able to survive. Being able to use it, not that you really want to, you know what I'm saying, you learn the skills but you don't really think you are going to have to use them.

In summary, the theme 'Self as stronger' described an increased sense of personal strength of character. Participants described greater resilience, insight, compassion, self-confidence, ability to accept circumstances, and greater skills, such as assessing needs and planning. These elements of personal growth were at times attributed to acting to help others, acting to respond to needs, and increasing their skill base.

#### *4.4.2.4 Better relationships*

Thirty-nine participants described closer relationships within their families, closer relationships with their partners, new friendships because of the earthquakes, having more regular contact with friends, and deepened friendships. Better relationships are a widely recognised outcome of the posttraumatic growth process, and could be more specifically described in models of posttraumatic growth. Better relationships might also be more likely to occur in individuals who have existing relationships that can be strengthened; again, social support might facilitate the process of posttraumatic growth and be involved in the outcome of posttraumatic growth. Some described closer relationships with colleagues and a special bonding over the hardships of being 'red-zoned' (informed that one's house is in an area of the city not suitable for habitation).

C127: There were eight people in the red zone in the end in my staff, the physios at [hospital] and, as I said, twelve at my husband's [work] so there was a lot of camaraderie, so supporting each other and being open

about how we are feeling and the frustrations and the dealings and sharing knowledge as well as sharing feelings.

Some reported their friendships as having changed, both abandoning less supportive friendships and gaining depth in supportive friendships.

C145: I've been quite surprised at how quickly people have wanted to move on, so my network of friends had probably fallen into two broad camps, those that can empathise with us, even though they aren't in the same space, and are prepared to listen when we are feeling down, and then those that just want to move on and actually want to leave us behind because we can't move on...so the circle of friends that I've got now aren't all people that are affected by the earthquake, but they just seem able to empathise with us. So they might ask me 'if you want to talk about it, no worries', and they seem to be able to cope with that. So I would say I have deeper friendships now, and I'm more enthusiastic about pursuing new friendships.

Participants described a greater closeness to family members because of the earthquakes. Greater appreciation of others' skills and approach to circumstances contributed to an increased affection for family, a greater perceived support from family, and improved communication with family members. Participants described making efforts to spend more time with those they loved, which likely highlighted a link between greater appreciation of life (and those in one's life) and better relationships with loved ones.

C127: The kids are resilient and we have grown closer together. I mentioned last year because the kids were school-sharing on the other side of town, we hardly saw them, so once a month we would have a weekend away somewhere, be it in a little cottage with no electricity, as you do, so our family life is a lot more open. The kids have matured so you can talk to them about things that are unsettling but [that] help them through.

C194: I think with the combination of the earthquakes and what happened with my son and grandchildren, if anything, family has become more important, we really value family time. But we have always had a close [family], I've got two brothers and two sisters, and grandchildren, and

nieces and nephews, we have a close extended family. We get together a lot as a family and still cling to that, so I think that has probably been reinforced.

Others described increased intimacy and respect for their partners because they have seen their partner's skills displayed in a new light. Communication during hard times brought some relationships closer, as did a shared appreciation of the simple things in life.

C203: The good thing about the whole situation is it gave me much greater respect for my partner in terms of his ability to take care of us and deal with all the time-consuming frustrating crap, and it brought us closer together in that we talked a lot about how the situation wasn't great and financially it might ruin us, but we had each other and we weren't going to let it define us, and we had one beautiful, happy, healthy child and another one on the way, and a lot of people struggle to get that. So that was what I clung to.

Participants expressed appreciation of their new or deepened friendships, some to the point where they reported the friendships being worth going through their earthquake experiences.

C166: We made some very good friends and I hugely appreciate the people who helped me unpack my house. We ended up living next to a woman who has become my closest friend, she is like an extension of our family...The friend I stayed with for two months was an acquaintance who said 'I have a spare part of my house, come and stay for a week or two', and after two months we were very good friends. I often thought I don't know that I would swap the experience for not knowing these people. I'm 52...you don't meet new people in a way that you get to know them long enough to be close true friends, very often, and to make two in a short time, I'm not sure I would trade them, they are pretty cool.

Closeness to others was connected to experiencing hardship, and linked to gaining a sense of compassion for the plight of others.

C209: I think that, you know when you go through a hard time and you find that you feel closer to the people around you, like there is more

connection and become a bit more compassionate, just with any hard time you feel like you understand people better.

New relationships were attributed by some participants to their helping actions during the earthquakes. Some participants had interactions with others during the earthquakes that formed the basis for ongoing relationships.

C146: Thinking about particular virtues and working on them consciously, things like generosity, seeing what other people are doing and thinking what I can do, so thinking more about what I could do to help. Relating to other people's situations. We have made some good friends through things like that. I saw people who needed help and I could help and consequently became good friends with them.

C131: I met [my boyfriend] because of the September earthquake. When we went back into our work building, he was the electrician and he came to fix the lights and he had to spend a day and a half there so at the end of his day and a half he asked me out for coffee. [We're] engaged now, that would never have happened if we hadn't had any of this.

C207: That guy that I helped out, we have gone and visited him twice in the UK in Scotland. I always wondered what had happened to him, and then we were across at one of our neighbours, and they said 'there was a guy on TV and he wants to see you', so I went and saw him.

In summary, the theme 'Better relationships' described an increased closeness to friends and family as a result of shared hardship, and also as a result of a shared appreciation of living. Experiencing hardship together allowed mutual support and gave individuals a chance to adopt new roles in a relationship, and to make new friendships. Such support and help could encourage a new respect for friends and family. 'Better relationships' shares characteristics of 'Appreciate the present more', in that participants described considering current relationships, investing in valued relationships, and abandoning draining relationships, just as they had placed less emphasis on possessions and more emphasis on enjoying everyday life.

#### *4.4.2.5 Spiritual or philosophical change or solidification*

Seventeen participants reported changes in their spiritual or philosophical outlook. Such a theme fits nicely with theories of posttraumatic growth that include grappling to restructure worldviews after they have been challenged. In Calhoun et al.'s (2010) model, this theme fits with narratives being challenged in adversity and being revised through the process of rumination to produce more complex narratives or wisdom. Some participants described strengthened beliefs, whereas others described pondering their beliefs and changes to these beliefs. For example, some described a sense of grappling with questions of belief in the context of the earthquakes and an emergence of a 'rawer' faith. Such themes describe the shattering and re-working of worldviews that is theoretically inherent in the process of posttraumatic growth, as specified by current theories (Janoff-Bulman, 2004; Tedeschi & Calhoun, 1996).

C127: I am pretty less able to think I can answer questions now, there's a lot more, I haven't even felt 'why them and not us?', there's no point worrying about that, and there have been some comments like 'we moved buildings and we were saved' and I think that's great but what about those who didn't move before the buildings collapsed and they weren't saved. I think my faith has become raw, just more basic, uncomplicated, don't worry about answering questions, just know that there is a lot more open and basically we can't change a lot.

Some reported a struggle with their prior beliefs, and that this led to a change in philosophy.

I: Do you think your spiritual beliefs, if you have any, have been affected by the earthquakes?

C142: Yes as in I used to be a full on Christian for a long time and it started with my separation, started to drop off. Seeing that some of the young students were killed, I felt that this was certainly not an act of God, it quantifies something like that, it made me struggle a bit with my faith. I don't know where I stand, but I can't say it improved anything.

C184: I think I believe less in God, but I'm not too sure whether it was because I started to think harder about God after the earthquakes. I've never been particularly religious, and whilst I might accept that there is some degree of spiritual being, I've become more scientifically thoughtful

about it since the earthquake, and therefore that's reinforced to me it's what we make of our life rather than some supernatural being.

Others described a strengthening of previous convictions.

C130: I think it's actually strengthened what I knew...that it's something you can't control and that you have the strength within, and that everybody does find that. They have different ways of finding it, but the other sense too is that because everybody has that inner strength. When you spend time with people, that's what you experience, you actually experience their strength. Your strength and their strength and if people find having an extra drink helps them, you let them. So to actually support their spirituality is as important for them as it is for you. So if they have spirituality in one way or they see this in a certain way, it doesn't matter if you understand it or not.

C167: I'm a Christian and I think it's reinforced the whole thing of anything can happen to anybody, you aren't protected from anything, who you are, in the sense that life hands out all the risks and all the potential thing because we are human beings as well, but for me there is definitely that reassurance that God is there, so that whatever happens, he's there, so this has reaffirmed that for me.

C175: I don't subscribe to a religious view, I'm an atheist so I don't believe in another being or another power, and that's not changed. In a way, I think that it has reinforced my philosophy in life, so aspects of that. If you are lucky enough to believe in your own survival skills and your ability to deal with a crisis and do all of that, I think it places you in a better position.

Some described feeling more spiritually connected.

C204: The spirituality side of things, I'm not religious but I think the more wellbeing type mindfulness, certainly feel more connected and a relevance of that.

Another linked modified beliefs to a gratitude and appreciation of life.

C189: I think my beliefs have slightly strengthened but my belief in dogma; I'm inclined to put the dogma in the same category as the horrible cack handedness of the Christchurch City Council. If it's dogma, then it's flawed. I think I've come to the conclusion that the word should be removed from the English language because it implies that somebody else is going to make a decision about what you think or should do. It hasn't deepened my spiritual awareness but it's made me more aware of the spiritual side of belief. I thank God when things happen, I will sing hymns like All Things Bright and Beautiful, when I drive down the road and I see the sun glinting off the sea. I feel that we are fortunate, that we are blessed and that to give thanks for the good things.

One participant noted a new urge to find patterns in events, and that others' predictions of earthquakes affected their behaviour, despite not believing the predictions.

I: Have you noticed any different ways of looking at things or differences in spirituality or appreciating life?

C146: Spiritually, I'm an atheist. I did notice a strong tendency to believe in things that weren't scientific, normally I like everything to be scientific, and proved, and rational, for me that's logical, I like to think in logical ways, but a part of my personality doesn't go that way and the earthquake brought that out. So I was looking for patterns and the next earthquake based on that, look for any connections which might indicate when the next earthquake might come, and lots of people had their own theories...A friend of mine who is into spiritual stuff she said there was going to be a big earthquake in December, she said the spirit world was unsettled around that time, and I don't believe in spirit worlds so it doesn't make any sense that I should listen to that, but I was conscious that I relaxed thinking it wasn't going to happen until December.

Some participants described an increased faith in God and finding peace in difficult circumstances.

C151: Part of it is for me learning to trust God more... and finding peace, even in difficult circumstances, so there's been a big learning curve on that front as well.

C210: [My spiritual beliefs are] very important, it's a language that I have grown up with and I think has always been able to mature. So some people grow out of the spiritual world that they were brought into but I was given a framework that could grow and mature, so it is an important cultural part of my life and there are resources within the Christian programme that I grew up in that would help to explain where God would be in an earthquake and why suffering might happen, but the reality of suffering just being part of the human condition and part of natural life and that that's not the point. The point is that love is stronger than death so it has reinforced my sense that love is stronger than death and relationship is more important than anything.

Another related a stronger faith to an appreciation for others in their faith community.

C190: I learned that you need a network, you need people, for us as Jehovah's Witnesses I think it's been faith strengthening in the fact that we have got an organisation that people care about us and look after us.

Finally, some attributed their coping to their faith (this theme will be expanded below).

C188: I was talking about spirituality, I've been exploring other faiths and things, sort of strengthening my belief in God, and I wouldn't say that's directly because of the earthquakes, but it's alongside that and maybe that helped me get through, the fact that I was strengthening my faith in God, it gave me the strength to face other things.

I: There have been some changes in terms of your spiritual beliefs during that time?

C188: Yes, just expanding my knowledge and practising my faith more.

Forty-eight participants reported no spiritual change. Of these, some reported no spiritual beliefs and no change in this, and others reported having spiritual beliefs that had not changed because of the earthquakes.

C156: I'm an atheist so I don't believe in any kind of religion, except perhaps for nature perhaps, that's my religion, if it's a religion.



C116: I was going to church about once every three to four weeks before, maybe I go once a fortnight now but has it renewed my faith, no, I think it was already renewed.

Some equated spiritual beliefs with religious beliefs, possibly indicating that a change in wording of the question may have encouraged participants to consider philosophical perspectives in addition to any spiritual or religious perspectives they may have held.

For example, one participant reported:

C177: No change in spirituality because I'm not a religious person.

In summary, the theme 'Spiritual or philosophical change or solidification' describes a number of participants examining their religious, spiritual, and existential beliefs in the light of their earthquake experiences. Some described changed beliefs, with faith 'becoming more raw' and basic, whereas others reported strengthened beliefs. Aspects of community were important, where others in faith communities could support each other and provide a sense of belonging. A church building was noted to give a sense of place that was lost when the building was damaged. Spiritual beliefs were linked by some participants to comfort and to a greater appreciation of life. Participants who did not consider themselves religious often did not report changes in spiritual or existential thinking. An area for future research could be to more clearly delineate existential thought from religious thought and this may allow a greater number of individuals to consider how their thoughts about the nature of life, the world, and their place in it may have changed.

#### *4.4.2.6 Better off than before*

Sixteen participants described some aspect of gain from the earthquakes, financially or in work circumstances, by having more work or more interesting work. This theme does not fit in the models and theories of posttraumatic growth, as posttraumatic growth is not considered to relate to material improvement. However, those participants whose circumstances had improved reported appreciation of this. One participant reported having more contact with family than otherwise.

C116: I feel like I'm pleased the earthquake happened. I feel that it's going to be a very positive outcome and that we are going to end up better

off than if it never happened, for a whole lot of reasons. Certainly financially.

C118: Yes, the one nice thing is that we have now got a grandson who is delightful and I spend a day a week looking after him ... and I have [my grandson] all to myself which is lovely and so that is a positive.

I: Do you think that would be different if the earthquakes hadn't happened?

C118: I think it would because they were talking about going to work in the [overseas] and [my son] was going to put a manager into the company, so I think they would have gone there for two or three years, maybe not, but it was pretty much on the cards. I think they decided because of the earthquake that they would stay here and start a family, which they did, so it's interesting.

I: What positive effects have there been for you from the earthquakes?

C125: We are going to have a brand new house for our retirement.

I: Have there been any positive effects personally for you from the earthquakes?

C165: I think I can honestly say that I'm busier now at work than I ever was in town. People seem to be a lot happier that I'm on the side of town I'm on, the parking is free. It's a plus or minus about the fact that I don't have to ride my bike to work, I'm quite glad because people I know have been knocked off their bikes in recent times.

In summary, the theme 'Better off than before' outlines objective improvement to aspects of the lives of some participants. Some benefited financially through gaining more work after the earthquakes, or enjoyed repaired or new houses afforded through insurance payment. While this small group of participants gained in some ways through the earthquakes, all also reported some degree of hardship.

#### ***4.4.3 Optimistic, positive appraisal***

Common themes in the narratives relate to posttraumatic growth in a variety of ways. For example, the theme of 'Counting blessings' expresses elements of optimism that are likely to link to posttraumatic growth; likewise, the theme of 'Needing others' describes aspects of social support relevant to posttraumatic growth. Such optimistic

appraisal also harks back to benefit finding. This positive appraisal is not allowed for in models of posttraumatic growth. While a balanced appraisal has been noted to be related to increased posttraumatic growth, perhaps positive appraisal is used to balance negative aspects of adversity. Positive appraisal relates to posttraumatic growth in the current sample and can be included as a component of the posttraumatic growth process in individuals coping well after trauma. This theme supports and speaks to the positive accommodation of a trauma described in Joseph and Linley's (2005) organismic valuing theory of growth through adversity. The following optimistic themes illustrate aspects of positive appraisal related to posttraumatic growth in the current sample.

Participants displayed a range of positive appraisals: of circumstances, of others, and of the self. Circumstances were appraised as fortunate in comparison to others, and compared to alternative courses of events. Some displayed a sense of humour, or reported interest or excitement about their experiences; others affirmed their attachment to living in Christchurch. Participants regarded their earthquake experiences in a positive light and past life events as valuable for learning coping skills. Finally, many participants displayed a positive sense of self. Participants showed self-regard and gave descriptions of the self as a competent individual. A great number also showed self-awareness about their own needs, displayed in descriptions of what helped with coping and in actions to provide themselves with such coping aids. Frequencies of each subtheme are outlined in Table 10.

Table 10

*Frequency of subthemes in 'optimistic, positive appraisal'*

<b>Subtheme</b>	<b>Number of participants reporting theme</b>	<b>Percentage of larger theme</b>
Knowing what you need	96	30%
<i>Need others</i>	70	
<i>Need self-care</i>	49	
<i>Need to keep busy, carry on</i>	25	
<i>Need 'home'</i>	21	

<i>Need to leave Christchurch for a break</i>	19	
Count your blessings	87	21%
Appreciate others' input	72	19%
Positive sense of self	65	15%
Lucky compared to others	54	7%
View circumstances as fun, exciting, interesting, an adventure	52	9%
See opportunities for Christchurch and oneself	39	5%
Lucky compared to what might have been	37	5%
Experiences are useful for learning	36	5%
Prior experiences as good for coping ability in the earthquakes	36	6%
See humour or irony	33	6%
Committed to Christchurch	16	2%

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#### *4.4.3.1 Knowing what you need*

Ninety-six participants described particular strategies or activities that were helpful in their coping. Participants showed awareness of what might assist them and acted to meet their own needs in order to cope. Such themes fit perfectly with Joseph and Linley's (2005) organismic valuing theory of growth through adversity, where well-adjusted individuals have an innate knowledge of how to act to meet their own needs

of autonomy, connectedness, and competence. This act of acknowledging and meeting one's own needs is part of the process that can lead to posttraumatic growth.

The following themes all describe participants identifying what they themselves need. These themes fit under the theme 'Knowing what you need'. Specific needs identified by more than 15 participants will be described. Most commonly, participants reported a recognition of a need for others, self-care, exercise, and keeping busy. Others described the act of creating or writing as helpful; some chose to consciously look for the positive in a situation; some looked to engage in pleasurable activities; and others left Christchurch temporarily for a break. Others described making plans as helpful; some outlined a need for home (to get home, stay home, or make a home); and others reported a need for the familiar and for routines. At times these behaviours supported coping in several ways; for example, one participant walked with a friend around the cordon, talking and deciding to speak positively.

#### *Need for others*

This theme was referred to by 70 participants and describes a desire to be with others, the value of others for coping, and the kind of support participants found useful. This theme likely relates to the social support Calhoun et al.'s (2010) comprehensive model of posttraumatic growth describes as influencing the rumination process after trauma. Widely, participants reported talking to their family and friends as helpful. Sympathy and listening from others were noted to be helpful, whereas some participants reported that advice-giving and retelling earthquake stories repeatedly was unhelpful. Focusing on others was noted to give a sense of purpose, a feeling of not being alone, and helped to build a sense of solidarity between individuals.

C173: [Some things that have helped me cope are] good friends and work colleagues, and that sort of stuff, and I think a big thing I have found being able to cope, is I'm not the only one that's going through this, and I think that really has helped thinking everybody is the same who lives in Christchurch. Some people are certainly not as affected as much as other people but as far as the anxiety of earthquakes and all that, it's probably been a big help for me. It's no use getting down and depressed about this because it's happening to everybody, not just me.

C164: I think talking about that stuff did help a lot, I think having people that you can see the experience with and discuss how you are feeling

about it, and finding out that the things you are doing, other people are doing too.

One participant described talking to her partner as helpful, and therefore made more time to spend with her partner than she had before.

C176: Talking about it with my partner [helped me cope], taking time out to be together, even if we didn't go anywhere, just simply scheduling our lives so that no one rings us before 10 am on the weekends, and we have put down some guidelines that the family can ring us only if it's an emergency, other than that, don't bother us. We deliberately schedule some time together. We hadn't thought about that before.

Some participants noted a need for others driving the growth of a sense of community.

C110: As we had all been through the same experience and needed reassurance at the time then we felt a lot closer, but since then, no, it's sort of drifted back again. You still acknowledge them because you have spoken to them before, but it's not a case of we are in each other's houses, things like that, just at that time of need we needed somebody, or they needed somebody to talk to.

Some participants described a sense of coping better with an earthquake because they were with others. Seeing others who were responding calmly to the earthquakes grounded participants and had a calming effect.

C117: Then the second quake hit when I was at [my friend's] house, the bigger one and it wasn't as bad with a group. Her daughter screamed the place down which made it sound a lot worse than it was, I remember thinking, 'When you have a beer in your hand and you are surrounded by people, it was almost like a party environment, the quakes aren't so scary', so that affected me as well.

C170: It certainly was stressful, but I think being in the environment where you were with a lot of other people and you were all dealing with the same thing, and also actually having something to keep you busy was quite beneficial.

Participants described the kind of support they found helpful. Participants reported support and listening as helpful, as well as talking with others who have experienced the same hardships. Telling one's story was reported to be helpful, whether to friends or as part of recording one's experiences for research. Receiving unwanted advice was cited as unhelpful, as optimistic predictions were experienced as platitudes. Some found talking about their situations useful, although others did not.

C122: Another friend that I've known for many years, she had great difficulty with her house and has been mucked around by her insurance company. We have found that we are good for each other because we can sit down and have a really good whinge, give each other a hug and a pat on the back and say 'There, there'. It's been very difficult having people say 'Maybe you should do this, maybe you should do that', and you go 'I'm that stupid that I wouldn't have thought of that for a start'.

C210: I think if we take away that whole factor of not having friends or family to support you, or faith through this, you end up doing things which you just can't cope with, you can't get through, and so how do you get through it. So you get through it with support of excellent friends and family, you get through it with the faith that you have, whatever it is, it's how people cope with that, and I've known that for years.

Some reported learning to accept help from others; learning to accept that they needed others. Being helped and helping others also gave an opportunity to forge relationships within the community.

C127: The kids helped us, the Barmy Army did come, and the student army turned up. We got a knock on the door the next day, two Asian kids who could hardly speak 'You want help?' and you go 'Oh no we don't need it', and then 'Oh we do', we were in the boat with everyone else now and so they started digging our liquefaction... It's being able to help people, being helped was a new learning thing, we don't need help, we are the helpers, so being able to say 'Yes, [help] would be great', and being able to ring when we could ring our church and say 'We need wheelbarrows'. The next day eight wheelbarrows turned up. We lost one on the side of the river but that got back to us, but being able to ask someone else 'Can I come and use your washing machine'. So being able

to help, asking people who had stuff for us, for ourselves and for our neighbourhood, but being able to help too, just popping in the car and dropping into someone's house.

In summary, a need for others to help one's coping in response to earthquake events was described. Others helped participants cognitively process their experiences and gave emotional and practical support. Participants could normalise their experiences and responses and felt a sense of solidarity through shared hardship. Some also mentioned appreciating the company of others who were composed at the time of an earthquake, suggesting that individuals who could be seen to be coping were reassuring role models.

### *Need self-care*

Forty-nine participants described aspects of self-care as helping them cope. Self-care behaviours included relaxation techniques, moderate drinking, adjusting behaviour when it was judged unhelpful or unhealthy, eating well, making an effort to engage socially, exercising regularly, and getting enough rest. The essence of this theme was nurturance of one's body and one's psyche, an awareness of one's own needs, and acting in a way to meet these needs. Relaxation and rest were described by many as measures of self-care participants engaged in to nurture themselves and manage challenging times. For some this involved sleep; others engaged in relaxation techniques, meditation, or massage.

C124: My doctor sent me to a guy that does acupuncture and massage. So I did that once a week, so that's a real good stress reliever because I don't drink. I have the odd glass of wine but as I've got older am less tolerant, it doesn't agree with me anymore, and I'm not interested in taking drugs, so it's mainly the planning and the physical massage is good for me. And you talk to people in similar situations.

C146: Uncertainty for me is anxiety provoking, so trying to get some certainty by asking questions and just working through it in my mind, and meditating.

A balance of work and leisure was identified as helpful for many. In such a way, participants focused on work while engaged in work tasks and made a conscious effort to rest outside of work, aiming for a nurturing balance between work and



leisure. Some identified a greater need for peace and made adjustments to gain quiet time.

I: So what kind of things have you been doing to cope with the earthquakes and the effects they've had?

C188: I take all the staff support days I can get. I never have been very good at homework, but I don't try and do more work, I'm not a workaholic, I do the best I can during my work hours but I let go of it when I go home. There has been the odd project where I have committed some home time to it but I make sure I get paid for it or I take it as time in lieu, I'm not making a martyr of myself.

I: Limiting the amount of time you spend working?

C188: Yes because I understand the need for balance and I know my family need my time more than work does.

C196: I had this funny ritual that when I finished work I would always wash my hands and my face and change my clothes, I would never wear my uniform home. My hands and face thing started because I forgot what I had been dealing with, if you touched them, I think it came from there. When I tell someone that sounds weird, sort of compulsive, but it turned out to be a real cool ritual of finishing the shift and if you exercised like rode or run home, there was this demarcation between doing something and you would have that getting dressed, being different and then this exercise where you just thought about your heart beating rather than anything you had done. So I use that in my personal life too, do stuff that is not work related or mindless like a bit of DIY... Just mindless stuff.

Exercise was described by 30 participants as helpful for coping. Some equated exercise with time to look after oneself.

C102: I am sometimes tense but I wouldn't call it really anxiety so, when I'm not doing well at work for example, then I have tension but again it's underlying so not dramatic. I have my strategies to deal with it; I do a lot of exercise or yoga so it's something I feel I can live with and cope.

Participants commonly, amongst other things, described initially drinking more alcohol after the earthquakes than previously, and at some time afterward recognising

a desire for moderate drinking in order to care of their health. Sixteen participants described drinking in moderation to relax.

C204: I would have said that we did drink more immediately after the earthquakes. Again not worryingly, but now I would have a glass of wine maybe three times a week, and I think we were probably having a glass of wine most nights. I think it was a mixture, not to reduce anxiety, I think it was probably a way to unwind quickly at the end of the day, it would be a pleasurable way to unwind quickly but never got to a worrying level. I was probably having a large glass of wine, more than a standard unit most nights, which is certainly more than I would normally drink. Now I'm probably drinking less than I drank before the earthquakes, I think I've been feeling better not drinking.

Choosing not to be exposed to earthquake-related material was important for three participants. This involved choosing not to watch repeated coverage of the earthquakes and the resulting damage incurred, and preferring not to discuss earthquakes frequently with others.

C162: I was thinking about coping with the earthquakes and managing the trauma. We didn't have any television coverage immediately following the earthquake for quite a long time, maybe a week or more because there was no electricity, and we don't watch television generally, and it wasn't until about a year later, or longer, that I saw a lot of the media coverage, so for me I didn't have strong visual images of what had happened to the city. Part of that was conscious, not wanting to be overloaded with trauma, and I would avoid going into the city. If someone wants to go and have a look I will go with them, but I purposely try not to overload myself with that stuff.

Music was noted as therapeutic by four participants: playing instruments and listening to recorded music.

C128: I had my LPs and I looked at them, I thought they would be bugged because they were all covered in plaster, this terrible dust, it gets everywhere, in your eyes, up your bum, everywhere very easily. But anyway I bought a little sound system for \$185, a turntable, tape deck and

CD player, which is while I'm waiting for the insurance to come through for a bigger system. I got it plugged in and I found my LPs worked, they weren't stuffed by dust. So I dragged out all my old negro blues and forties and all that, got back into Cohen again, a lot of his work plus his poetry book, and I just sit in the house. I've got a marvellous view over the harbour, a solid wooden house, it's got to be re-done by the EQC actually, and I just sit there watching over the harbour, watching tugs come and go, and listen to Cohen at 12.30 before I go to work.

I: Does that help you cope with the stresses?

C1128: Yes, it sounds good and it feels good. It's something I always did by myself; I've always put music on as background, now I don't. Now there's something there for me to listen to and nobody else, because if there's somebody else they will want to talk and I want to listen to them.

Writing was cited by six participants as helpful for coping. This was for some a way of recording history and personal experiences, and for others a method of processing experiences.

C109: One of my main coping strategies is I write. I buy a big diary with a huge page for each day and I've always processed stress with writing. At the top of the page I record 'Woke up', 'Got up', which is incredibly... – my son always used to tease me about 'Woke up', 'Got up' he said one day [participant's name] you'll have to put 'Didn't wake up', 'Didn't get up' (laughs). And so then I process what I did that was good, so you know, good food, like if I have lovely food I write 'Good food', and if it's a sunny day I write 'Sunny day' and if I've been out if I go to a movie I just make a really big fuss of all the good things about that day.

I: So do you just write down the positive aspects?

C109: No, no, in tiny tiny little writing I sometimes write little things and hope no one reads that (laughs). And I colour, I really wish I was – I'm looking at this art on the wall – really wish I was good at art but I'm not. So I bought myself a whole lot of coloured pencils, and I colour the pages as well.

I: And that relieves stress?

C109: I find it incredibly helpful.

C112: A year after, when everyone was looking back, I took the time to write down that story that I've pretty much gone through just around the immediate shaking and coming down to the Square, and the video because I thought your recollection fades and changes over time and I thought it would be quite good to write that down, so I wrote it down and put it up on social media, Google Plus, and Twitter and stuff and some of the guys at work had a look at it, so I found that was useful.

Eating was described as a component of taking care of one's body and of responding to the body's needs.

C190: When we were staying with our friends... I've been a vegetarian since I was sixteen, and I'm thirty eight now and I eat fish but I haven't eaten any red meat since I was sixteen. We were so tired and there was a big group of us around dinner, and the smell of this meat was so delicious, it was a big eye fillet that had been coated with rosemary and garlic, and it came up and got served up and there were lot of options, there was roast vegetables and salad and everything else, and I just started eating this meat and there was silence around the table, and everybody was looking and saying 'oh no, she's going to go on a rampage and start attacking animals and children'. After the February earthquake we had been out digging liquefaction and you get so tired and we were back at another friend's place and they had chicken kebabs and I ate one of those and everyone is 'She's an earthquake carnivore!' I haven't touched it since. I needed protein.

The essence of this theme was an appraisal of the self as worthy to care for. A positive sense of self seemed to underlie a knowledge of which actions would aid recovery and a willingness to act in ways that nourished the self.

*Need to keep busy, keep working, carry on with life*

Twenty-five participants described keeping occupied, carrying on with life as normally as possible, and working as useful activities for coping. Taking action was cited as helpful for coping through feeling effective and through distracting oneself from worry about earthquake-related problems.

C119: Just sorting out the things that needed to be done and actually going through and doing them was probably the most helpful thing. I wasn't going to sit on that playing field in a deck chair and wait for someone to come and help, we knew we had to do something so we just did it.

### *Need 'home'*

Twenty-one participants described a drive to return home after the earthquakes, or a desire to return to Christchurch if they were out of town. This theme involved a sense of home as a sanctuary and an inner urge to return home.

Some described needing a place where they felt 'at home', enjoying being at home, or wanting to stay at home in Christchurch while there were aftershocks (rather than leave town). Many described needing to make a new home, a private place of refuge. Some reported wanting to stay at home in Christchurch so that they could be present in the event of possible aftershocks.

C106: A friend of mine said 'I've got a room to rent, come and stay at my house', so I did and it was OK for a little while but it didn't suit me because it was my friend and it was changing our relationship, I didn't like it too much, just the dynamics of that relationship, so I thought I really need, and also the clinic that I was working in was quite expensive, so I thought I really need to find, my solution was to find my own place to work and live out of, and it would keep costs down and I would have privacy. I do like living in community but I like independence within that, and living with my friend felt too kind of close. So I found my own place, which is cool, it's a little cottage... and it's like a little refuge really.

C204: That was actually the shift of things starting to improve for us because we then had a home again that was ours and it meant that the battle with EQC and insurance could take however long and that we were alright... So that was the most positive thing we did and made our lives so much easier, because it's easier [to get to my son's sport's training] and we have got a home. When people say their houses are damaged, it's actually not that, it's their homes, and that was incredibly poignant for us, so I think we have all felt better since we moved.

#### *Need to leave Christchurch temporarily for a break*

‘Need to leave Christchurch temporarily for a break’ saw 19 participants describing taking short holidays that allowed some relief from aftershocks and earthquake environments. An opportunity to ‘regroup’ is described, and taking a break is described as ‘saving our sanity a little bit’. Holidays gave reprieve from ongoing aftershocks and living without basic services. Some reported breaks away helping improve sleep.

I: So what kind of things have you been doing to cope with the earthquakes and their effects?

C116: Trying to get away once a month, certainly until the last two months, always looking for excuses and felt quite justified in grabbing that trip to Wellington or going to Hanmer or going overseas, going to Fiji, changing the one holiday a year to two, so I think that’s part of it.

I: What kinds of things have you been doing to cope with the earthquakes and their effects?

C132: I guess the first thing was to get out of town for a bit, which we did, I think that was really helpful to just manage our personal response. I guess I wanted to feel calm for my kids, I felt I couldn’t cope unless I was calm myself, and I think that really helped us. We went to Nelson to stay for about five days, and just lie on the beach and watch people being normal that was really nice. Then we could come back and regroup to a certain extent.

#### *4.4.3.2 Count your blessings*

Eighty-seven participants reported either ‘counting their blessings’ or ‘seeing silver linings’, or identified or listed positive aspects of their situation. Some described themselves as generally appreciating life regardless of the earthquakes.

Listing positive elements of a situation was common.

C138: So that’s the work part, and the general back in Christchurch part coping with that, the house was OK, lost a few things, the house is fine, we live in a good street where everyone has got everything, it was a great street, the kids were fine about it all. My other half, he made the long drop

and all that sort of stuff, it was fine...The aftershocks were fine. My youngest didn't quite like them but it was never any major problem.

Also common was that when a situation involving a hardship was described, it was followed by a positive counterpoint of the situation. This way of presenting information transformed a negative element into a positive statement.

C127: So [though it] was chilling to see the results of these patients involved in the horror that day and trying to help them through, that was challenging in a good way. To be part of that and to be able to cope, knowing that I was one step removed from that but still empathetic.

C166: [There have been] a lot of reversals and frustrations, it's been like climbing a sand hill, but we have ended up somewhere good in the end.

Other participants, who described benefits to their circumstances, more overtly referred to 'silver linings'.

C186: Again you see the silver lining in everything but one of the really lucky things from my point of view is that I have been able to stay in my home. That's my little sanctuary and I feel safe there, and I've been able to stay there. We have had all the insurance hassles and the house is going to be demolished so I'm not going to be able to live there but the good thing is they aren't going to pull it down for another year, so we can stay there and it gives you time to find something.

Some participants reported a pre-existing appreciation of life that had not been influenced by the earthquakes.

I: Some people mention changes in appreciation of life or spirituality, does any of that ring true for you?

C180: I was pretty appreciative of life but I appreciate my family at least as much afterwards and I was pretty appreciative of my social network and still am. I think perhaps if I had been a bit more blasé about that sort of stuff before it might have changed me.

Frequently participants described simple appreciation of aspects of their circumstances, such as having a toilet, ability to communicate via text message, and having access to water.

C130: So for that first period after the September 4 earthquake we were just getting a handle on what we could and couldn't do and living without power and realising that we couldn't use the toilet. So what he did basically was he built us a superb throne in the garden where we could go, and built a barricade around it and I remember we got a handle on what we could do with that. We were delighted that we had enough water, we phoned a friend who said we could find water by doing this and that and we were picking up spring water in the bay for doing certain things.

Others described counting blessings as a way of approaching life, a philosophy.

C133: Apart from the people that lose lives, but then that happens every day, it's more inconvenient than a disaster, and you get through inconveniences and you work through the things. You count your blessings, you recognise how lucky we were to survive it, a house is a house, that can be re-built, the stuff that I really valued, like the original art, the handmade furniture, the stuff that you couldn't buy from Harvey Norman, I managed to salvage, all that sort of stuff.

C194: I have always taught people to slow down and smell the flowers and be aware, and I think that's my link to gardening. We are nature people and have done things like tramping. I just value those things.

In summary, the theme 'Count your blessings' describes participants identifying positive aspects to their circumstances. Commonly, positive aspects were described in tandem with negative aspects of earthquake circumstances, showing a balanced appraisal of hardship and fortune. Presenting a negative aspect before a positive aspect also painted circumstances in a more positive light. Some participants displayed 'counting blessings' by listing benefits to their situations; others more overtly described looking for the positive as a way they approached life.

#### *4.4.3.3 Appreciate others' input*

Seventy-two participants described the actions of others in positive ways. They described appreciating the actions of strangers, friends, family members, police, schools, employers, colleagues, and insurance companies. This theme shows participants noting when others met their needs in difficult circumstances, noting the kindness of others, or describing their admiration for the actions of



others. One participant involved in the earthquake response reported appreciation of others involved driving several hours overnight to help, and sending supplies. Support from others gave a sense of solidarity, of nationwide effort.

C184: We had guys turning up from Invercargill, driving through the night with trailers full of BBQ gear, totally self-sustained, Timaru, and so on. This is on the back of the Global Financial Crisis when everyone had absolutely no staff, on the bones of our arse, and the operators were coming up, you were incredibly moved by that, and you had a sense that we weren't alone, we were involved in a New Zealand issue. It gives you strength and resilience, all those things you need at a time like that. I was able to observe too how the New Zealand supply chain reacted. I was going to phone a lot of people organising timber and I had a phone call from a guy who owned a timber mill in Hawkes Bay and he said he had a truck and trailer-load of wood, did we want it, and it was there at six the next morning, he had come through the night. We were getting packages of gear arriving with handwritten notes.

Another reported the kindness received from others in another town after the earthquakes.

I: You mentioned the community in Nelson was quite helpful?

C193: Yes it was amazing. I got booked for parking outside the library because you don't think straight when you are under stress wondering what's going to happen, it was like survival strategy, would we be going back to Christchurch? I came out of the library and said 'I'm from Christchurch', she said 'You poor woman go over to the Council, they will be fine with you'. So I went to the Council and [said] 'She said that will be fine'. I thought 'Coming from Christchurch has got a lot of mana in this town'. She said 'Is there anything else we can do for you?' I said 'What do you mean', and she said 'There's people who have rung in and there's things they want to offer people, there's a lady who wants to give flower essence remedy, and there's another lady who will give free massages, some people have got houses empty'.

Services, government, and emergency aid were appreciated for their supportive roles.

C115: I was thrilled that I live in New Zealand for this to happen because the Government and the Red Cross and the emergency services were just so on the ball.

C130: I remember just how good the Police were. The main street was completely blocked off and they had emergency people trying to bolster up windows and shore up things that were half coming down and these lovely Police people near the shop and they said 'The shop's open' and they gave us a free newspaper.

C142: I found [Canterbury Earthquake Recovery Authority] did everything to help us and make our situation work. I know they have their hands in their hair because it doesn't matter what they decided, fifty percent of the people weren't happy about the zoning and that is purely because some wanted out and some wanted to be back in their places... we tried really hard you know, we were still white[-zoned, awaiting a decision about whether the land will be approved for residential real estate] when everyone else had the outcome, we were the last to be zoned in Christchurch last April, and they had a really personal approach and when they told us, it was lovely. They called us into the office, coffee and cake there for us, they were really pleased to be able to say to us 'You have gone green and we are just going to ask you to stay out of your houses while the hill is remediated'.

Workplaces were frequently praised for their flexibility and compassionate approach toward employees. Workplaces were commonly reported to have helped participants in need, allowed flexible leave, and allowed employees to make decisions about their work based on what was best for them.

C149: Work was really good, if they really wanted to, they could have said 'You are obliged to be involved here, you can't go', but they just let people do what they needed to do, which was lucky.

C121: Because my husband is away, the Army were phenomenal with me and rang me quite regularly while he was away to make sure I was OK and whether I needed any help from them to clean up the house which I thought was quite remarkable, but I have [my husband's] family around

which is quite nice so that was quite lucky to have them basically be the backup for him.

Participants reported admiration for friends, colleagues, and strangers who were of service to the individual or to Christchurch. Colleagues helped with work matters, strangers helped provide for basic needs such as food and housing, and others were kind to participants.

C150: We had a wonderful guy coming in, when he could get past the cordon, but sometimes the soldiers or the Police didn't want to let him in. A farmer from Oxford who came in with a truck and trailer and two thousand litres of water and he would go round our little loop and distribute, and he came in with other things sometimes, food. That was pretty good.

C133: We are still in the rental in Colombo Street and once again, that's the kindness of people, we thought we were going to get to rebuild a lot faster than it's turned out, but they have been happy, they want to sell because they have now moved to Auckland, the whole family. They said 'We can wait until you are ready to move back in and we will sell it then, we don't want to throw you out', recognising that it's difficult for the family grouping that we've got to find suitable accommodation and the trauma of having to move again, and again, so we have moved what we could into storage and out of storage, all that sort of stuff.

In summary, participants commonly described the actions of others in positive ways. Appreciation for friends, family, and neighbours was described and underpinned a greater sense of connection with others in Christchurch and the rest of New Zealand. This theme suggests that positive appraisal of others' actions, combined with opportunities to interact with others, contributes to a greater sense of connectedness.

#### *4.4.3.4 Positive sense of self (viewing self as capable, calm, adaptable, practical, or optimistic)*

Sixty-five participants described themselves using positive adjectives such as capable or calm, and spoke of themselves as able to cope with change, to respond practically to needs, or as having a positive outlook on life. This positive sense of sense is not

considered specifically in models of posttraumatic growth, but may be an expression of the organismic valuing process in Joseph and Linley's (2005) theory. A positive sense of self likely supports active, approach coping associated with posttraumatic growth, as an individual considers themselves able to be effective where they choose to act.

### *Capable*

Half of participants described themselves as capable in various ways. Some reported coping during the earthquakes; others specifically described themselves as strong or capable. Some described pre-existing strengths that were built upon during earthquake events.

Participants frequently described how they coped with earthquake events.

C196: You have to get used to coping with normal stuff anyway and the earthquake stuff is an add-on. Sometimes I describe it like having a part-time job...so busy, we have coped. Again being in [my line of work] for seventeen years, lots of death and destruction, you just cope with it anyway, you find little ways.

Participants displayed a perception of themselves as strong, capable, and able to cope with past, current, and future events. A faith in personal skills and ability was reported, and some described enjoying challenges that emerged from the earthquakes.

C173: I've always considered myself quite a strong person anyway, but I probably think now if you can survive and get through what we've had to get through in Christchurch in the last two or three years you are a pretty strong person.

Many identified the earthquake situation revealing pre-existing strengths, skills, resilience, and positivity.

C182: I think the February earthquake really showed up that I'm led from my head, a practical thinker. In the office within a second I was on top of what we were going to do. There was hysteria and panic and frozen people and I was 'Right, what are we going to do, let's just do those things'.

Participants acknowledge their skills and the usefulness of these.

C116: My parents in particular, I've ended up getting them a much better house than what they had, it's certainly going to suit them better, and that was not being afraid to say. I think that people could easily take what they are offered if they don't know their rights regarding the whole 'like for like' so that's played to my strengths and I've enjoyed that too.

### *Calm*

Twenty-nine participants described themselves as calm at the time of the earthquakes, or as characteristically calm people.

C101: If it's a crisis in general I'm very calm so I guess that just kicks in. A few colleagues were upset and crying so you just comfort them.

C166: It is partly my own nature, I'm not a panicker, but also I'm a doctor, so as a junior doctor you learn awfully quickly that panicking, freaking out just doesn't work, you have to be quite pragmatic, and go 'This person is trying to die in front of me but I need to put that aside and decide what I do next'. So I have quite a lot of experience of keeping, at least the semblance of calm in a crisis. I am quite good at that, partly personality, partly training.

### *Practical*

Seven participants used the word 'practical' to describe their natures.

C182: There was one guy yelling and panicking people, and I said 'Stick a sock in it, get what you need', he yelled 'Get down the stairs', I said 'Leave, be quiet, nobody run down the stairs, take what you need'. I tend to get into a practical mode; I'm of the idea that hysteria doesn't help the situation.

### *Optimistic*

Nine participants identified themselves as 'optimistic', looking for positive elements in circumstances.

C116: Is God the reason that I've got this personal outlook? I don't know, I think that my personality, for better or worse, is somebody who is fairly optimistic, and that despite being in a slightly pessimistic family, and I'm

adopted so one of my birth parents is very optimistic, make it happen sort of person and the other is incredibly nervous, anxious and pessimistic, so I'm just really grateful to have that outlook and not be the sort of pessimistic person. So is that genetic or spiritual, I don't know, I think it's probably genetic.

C201: For myself I'm quite a positive person anyway, I look on the good side as opposed to the bad side of things. I love encouraging people and seeing people grow through their trials that they go through. So I think that's my nature. I don't avoid conflict because I like helping people through conflict.

#### *Adaptable*

Six participants overtly described themselves as coping well with change. They perceived this as either because of experiences, such as training in improvisation, or part of their personalities.

C110: I suppose living in different places around the world I've accepted so many different things. It's not just everything as I see it, things can change. I've always been easy-going about how things change.

In summary, many participants explicitly described themselves in positive terms and showed a faith in their own abilities to respond competently to difficulties. For some, the earthquakes were perceived to reveal pre-existing inner strength. It is likely that a positive sense of self described by these participants corresponds with a sense of self-efficacy and could mean that participants were more likely to take action where possible because of a faith in the likely efficacy of their actions. Further, such actions may have boosted a sense of agency, personal strength, and connection with others.

#### *4.4.3.5 Lucky compared to others*

Fifty-four participants described being 'lucky compared to others'. Participants considered their position compared to that of others, and consequently perceived their position as fortunate. Some described their problems as of diminished importance after comparing them to others' problems.

C122: Then I managed to come home after I had been at my friend's place and I had power and water and gas, so I was quite lucky whereas a lot of people didn't have those things.

C138: There is always someone worse off than you. How can you possibly be angry, upset when someone else has lost their home?

Participants described being lucky and grateful for a range of circumstances: grateful for coping, grateful for living in New Zealand rather than elsewhere, fortunate compared to times in history such as war-time in Germany.

C104: The earthquakes themselves haven't really worried me yet you hear them coming and you almost in your own mind saying 'Now I wonder what direction that's from and how big it's going to be' and then it's a competition, so it's not really affected me. They come into the category I can't do anything about it so whatever, and I think I'm quite lucky in feeling that way because I know a lot of people that don't and can't and don't understand this at all.

C147: It might be honestly because I come from Germany and my father, who is 70 and had to go to the war and all of it and when I grew up the city where I grew up had lots of destruction still, and maybe the whole background that things are constantly changing. It is just that I often think 'that's life', it's life that things are happening you have to deal with and they are once in a while not that pleasant, but we are overall anyway extremely privileged in the earthquake situation.

Many described this sense of fortune as instrumental in gaining perspective, reframing their own hardships, and helping to cope.

C125: I haven't been frustrated with all the process of EQC and all that stuff. Here's a good example as to why, our client manager from [our insurance company] rang me when we were [staying at the beach] to ask how we were, I was the only one home, and I said 'pretty good thank you in Paradise Park', and I said 'how are you?', and she said 'not bad, our daughter is living with us because her house is destroyed and we are both living in our garage', and she was speaking to me from there because for

some reason they had to do that for the first three months. I thought we were fairly blessed.

I: What kind of things do you think have helped you cope?

C155: I think it's something to do with relativity in as much as I consciously and unconsciously compare, I know they say you should never make comparisons, but there is always someone worse off than you, there is always some situation that's worse, so I definitely approach life with that, and I'm definitely a person who counts my blessings.

This sense of being fortunate compared to others often sparked generosity and compassion in response to the hardship of others.

C127: Our living outcome is incredibly positive, very fortunate with our insurance offer and resettling. Some lose, some come out equal and we have gained, and we know that, and sometimes I feel guilty about that, but then I think we have got a place that we constantly work at trying to share with people and we are still trying to work out how to give some kind of accommodation so that people can come and have a really good treat without us going back into huge mortgage.

Some participants noted their fortune compared to others while describing the context of their own hardship; this suggested they perceived they should downplay or dismiss their own hardship because others were less fortunate.

C190: I found it very hard getting help from people and I had to learn you have to accept it. The hardest thing, which is embarrassing considering what other people had to go through, the whole idea of getting a handout from someone is so repulsive to me.

C210: Two days after the quake we were still sleeping in the front room because we didn't have any furniture and there was this huge aftershock and [our young son] said 'that's an earthquake, we can cope with those'. I don't know who had talked to him, maybe he had learned it at school, and I thought 'that's good'. Of course we didn't have nearly as much to cope with as some people, and I'm acutely aware of that hierarchy of suffering within the city, we were so far from the top of that, we always knew that.



In summary, the theme ‘Lucky compared to others’ included participants’ descriptions of themselves as fortunate compared to others. An appraisal of fortune diminished a personal sense of misfortune and helped participants to cope. Participants were grateful for their own coping compared to others who were not coping so well; they valued living in New Zealand, where disaster recovery was efficient compared with overseas; and they appreciated health, housing, and basic services, where others lacked these. There was also some suggestion of a perceived social pressure to downplay one’s own difficulties when other individuals had been more adversely affected.

#### *4.4.3.6 View circumstances as fun, exciting, interesting, an adventure*

Fifty-two participants described some interest, excitement, or sense of fun or adventure associated with experiences during the earthquakes or their aftermath.

Common was a description of the earthquakes as exhilarating, adrenaline-inducing, ‘cool’, an adventure, or an experience to be revelled in or enjoyed.

C103: I turned on the light and remember seeing the walls bulge, just being really, really excited because it was cool – that first one was like an experience. I had been through a couple of wee earthquakes, just small ones, and had always wondered what it would be like to be in a big one, anyway I got it. It was cool. I was pumped afterwards, this was awesome, everything was shaking. The kids were cool.

C145: We looked at the damage in the house and thought ‘The house is still standing but it’s not safe to move back in,’ so we went and stayed in a tent on a friend’s lawn. That turned it into a bit of an adventure.

One participant described a perception of beauty in the experience.

C106: We were both OK, but the most beautiful thing that I saw on the way as we were going past... the Clifton Terrace by Sumner, the big beautiful cliff, there was a moment of silence and then birds from those cliffs swarmed in the sky, it was amazing, all the sea birds went and then everyone in their cars and everyone who was walking just stopped, there was another moment of there was something going to happen here, and I

thought it was stunning. The cliffs that we were cycling beside and walking beside tumbled down and to a metre of us, these rocks just came to within a metre of us, it was absolutely stunning. At that point in time the sky was really blue so there was another beautiful scene where the sky was blue, the birds were all in the sky, every bird and everyone was silent and all you could hear was the earth, it was absolutely spectacular.

Many described an intellectual interest in the earthquakes and their effects, a curiosity in the power of the earthquakes and the different kinds of damage they caused in different parts of Christchurch.

C110: February, I'm just sorry I wasn't standing around looking at trees, buildings moving, but then when I realised how much the ground had moved. As I went down on the step, overbalanced on the grass and then put my hand down and realised I was standing up. When I started the path was here, when I stood up the path was there, how much, without even realising it, how much I had moved and of course the fridge lying across the door, how close did that come to actually hitting me as I came through the door?

I: It must have been quite frightening?

C110: Not so much frightening, as curiosity, how close was it to me? I've been close to death and stuff like that in the... Army, you feel the bullets going through the trees and wonder how close they are and you can't see anything, and that was more curiosity than being scared of it.

C158: Aftershocks, I have found the earthquakes really interesting and I've just researched everything I can. I don't panic or freak out about anything really these days.

Many expressed a curiosity or interest in observing the range of responses in others.

C147: Many of our friends had the same issues and it was interesting to see how they got ticketed or not ticketed, because many of our friends were stressed at the time for quite a long time as ourselves, and it was interesting to see the dynamics which took place, and the relationships

they had, and how they looked at what had happened, and how different it was at times the way other people looked at it to the way we looked at it.

Some described relishing the challenges provided by the earthquakes.

C129: I thought about this as I was coming here and I thought ‘Why was I not bothered by the earthquake and stuff like that?’ and one of the things that came up was it was like an adventure, something different is happening, something out of the normal, something to be handled.

To summarise, many participants experienced some aspects of the earthquakes as enjoyable. Some described the adrenaline surge in an earthquake as exciting; others relished the challenges produced by earthquake events. Many displayed an interest in the effects of the earthquakes, a wonder at the power of the earth moving, and a curiosity about how the earthquakes affected buildings and other individuals. Participants were open to the new experiences that earthquakes brought them.

#### *4.4.3.7 See opportunities for Christchurch and oneself*

Thirty-nine participants identified opportunities brought about by the earthquakes, such as an opportunity for Christchurch to be rebuilt in an interesting or exciting way. Others reported finding opportunities for themselves, such as rebuilding their house or moving house. Others reported career opportunities emerging from the effects of the earthquakes.

Many described the rebuilding of Christchurch as an opportunity.

C137: I think the city is going to be fabulous, I think it’s just going to be an awesome place. I hope that I’m still alive in twenty odd years; it’s going to be magic. It’s not my regular words, but for the first time ever we will have a city that’s a New Zealand city as opposed to being an English city, it’s going to be European, Asian, Pacific Island, Maori, it’s going to be the lot, when previously we’ve had a Scottish city in Dunedin, or an English city in Christchurch, those sorts of things, and that’s a positive.

Others saw possibilities for their own rebuilding or repairing. Opportunities to make repairs or improvements to one’s house were received with relish.

C116: My partner's first thoughts were 'Great we are going to get a new house out of this', and there was a degree of that for me as well. We had just been visited, a week or two before that, by EQC doing the assessment, and they had already worked out what they were going to have to spend based on September, so I thought 'If that's the case, this is so much worse than September, then we are definitely going to get a new place'. I was actually quite excited. I was able to see the positive benefits...

Some described career opportunities gained from the earthquakes.

C155: [I] read everything I could get my hands on and it actually created really significant opportunities for me in the work I do, so that has been a real plus for me in terms of I enjoyed the job anyway, but I found it even more challenging and more enjoyable, and I suppose I have made some really significant progress. People now ask me to talk overseas and stuff, write articles, so that's been a positive outcome.

Others described the experience of the earthquakes as an opportunity in itself: experiencing the shakes of the earthquakes and being present when a momentous geological and historical event occurred. The earthquakes were also lauded for triggering change and new creativity in a community previously described as conservative and 'stuck in its ways'.

C134: I think it's weird but it's exactly what Christchurch needed. I'm born and bred here and I'm fifth generation Christchurch...I've lived overseas, I've done my travelling and I've lived in Auckland, all those kinds of things, and I came back to Christchurch and I found it very stuck and very stuck in its own world and I didn't find it very forward thinking. It was almost like it was run by that old school thing that you just couldn't break through, it may still be. The buildings as well, it was like, Manchester Street just felt really stuck and so it needed a bloody good shake up, it sounds weird and things, so I think now it's really exciting.

C156: I was proud having this experience because it is very common earthquakes and yet not many people directly affected so in the sense of being a survivor makes me proud to being able to experience this incredible force of nature, it's something you couldn't imagine. I've

experienced high seas and believe me it's scary when you have waves coming towards you and howling winds tossing you and all that, or when you are climbing, within seconds, this sunny afternoon turns into a blizzard within seconds and then could kill you within seconds. So these are incredible brutal forces but it's nothing as violent, abrupt and unimaginative as an earthquake, so I feel honoured to be part of that.

One participant, a writer, described a new possibility for artistic expression.

C199: Also, I think if you are a creative person, it opens up a new avenue of creativity. I'm a writer so I'm going to write about it so it gave me an experience where I could write about earthquakes which is never a subject I would have chosen. A lot of people wrote stuff about the earthquakes, there were over 2,000 contributions to The Press poetry page.

Christchurch has become a city that is more aware of the artists in its midst because of the emergence of art all over the place. The earthquake made spaces for people to interact with art.

In summary, opportunities were identified that had been brought about by the earthquakes. Widely, participants described opportunities for Christchurch to be rebuilt in new, exciting ways that acknowledged the city as a multi-cultural, modern New Zealand city rather than a more traditional city influenced heavily by English heritage. Opportunities for attractive, interesting design were discussed, as well as opportunities for Christchurch society to become fresher and more vibrant. Participants identified personal opportunities to rebuild their own properties in new, pleasing ways. Some saw career opportunities emerge through different kinds of work being available and because of increased knowledge they had gained after the earthquakes. Finally, some mentioned the earthquakes themselves as unique events they were given the opportunity to experience in their lifetime. Such descriptions could relate to the New Possibilities domain of posttraumatic growth, where individuals note new roles and relationships brought about by their adversity.

#### *4.4.3.8 Lucky compared to what might have been*

Thirty-seven participants mentioned the theme 'lucky compared to what might have been', which is similar to those of 'count your blessings' and 'lucky compared to others', in that participants reported their circumstances as fortunate, and reported a

gratefulness or thankfulness. This theme is distinct, however, in that it describes participants reflecting on alternative turns of events; frequently they describe ‘near miss’ events. Participants reported themselves to be ‘lucky’, ‘fortunate’, ‘grateful’, ‘relieved’, and ‘thankful’. Fragility of life is realised; vulnerability is emphasised.

C163: [I] felt that I was lucky in a way that I was spared, my husband was spared, because it could have been any of us.

C116: There was a sense of ‘gosh, that could have been me, had I not been made redundant from that position [in the building that collapsed] or had I been re-employed to do the programme that they were looking for someone to take on again’, so there was slightly that ‘dodged bullet’, grateful to not be there, because I would have been the sort of person that would have been in the office.

C175: We were outside a church...this huge church, and there was a huge aftershock about an hour later and we both stood there and watched the roof of this church go up ninety degrees, like a big hinge, it just went up in the air and the back of it dropped down again. It was just extraordinary, and we thought how lucky we are to be alive.

This theme captured a sense of relief, an awareness that circumstances may have been different and that participants could easily have been worse off. Such appraisals gave a feeling of ‘luck’ and of increased appreciation of circumstances because one did not experience negative events that could have occurred.

#### *4.4.3.9 Experiences are useful for learning / I learned from my earthquake experiences*

Thirty-six participants described experiences such as the earthquakes, and other stressful experiences, as useful for learning. Trauma was seen as an opportunity for growth. The earthquakes were seen as a valuable experience upon which to reflect, and from which to learn new skills. Participants described being better prepared for future disasters because of their experiences in the earthquakes. The earthquakes were seen as an opportunity to learn about human nature and the range of responses to trouble from helping others to hurting others.

C140: Any difficult experience you go through gives you personal strength, makes you a bit stronger, more resilient, and I think it helps going through something like that because it means you are less phased and helps you deal with any petty crisis that can happen in your life.

C199: One of the things that came out of the earthquake for me was the realisation that in some strange way trouble is good for people, because when everything is going well who cares but when the community is threatened there is a survival response and a communal response to preserve the community and the amenities that you have got... I think my experience of the earthquake was an affirmation that I believe about the possibilities of human nature. You had people burgling and burning properties but the statistics will prove that's in the minority. I even believe that crime dropped in Christchurch in the immediate twenty-four months, and also suicides, I don't know whether that's true, so what does that say about what disaster does for us. I lost a friend and people lost husbands and wives and people died but maybe it taught us all something...

Practically, participants described learning from previous earthquakes what they would need to do to prepare for future earthquakes.

C132: I guess then what we tried to do, was keep things as normal and routine as possible, you had already had an Emergency Kit so I thought it would be reassuring for the kids that we go through it everything that was in it, put it in a place that we all knew where it was, and we all knew what we would do, how we would do it, the difference between planning for an imaginary scenario and the reality of the situation. We tried to keep it like, 'well this is the situation we found ourselves in and that's how we are going to get through it'. That's how we will try to do it and sometimes people will feel out of control but we will try and talk about that.

This theme saw participants describe a positive potential for earthquakes and stressful events to teach individuals about themselves. Challenging circumstances were seen as offering an opportunity to improve.

#### 4.4.3.10 *Prior experiences as good for coping ability in the earthquakes*

Thirty-six participants described the experience of coping with prior stressful events as useful for their coping with earthquake stressors. This theme fits nicely with Study 1 findings that distress associated with previous life stressors is associated with posttraumatic growth. Some mention age, training, and experience as giving them opportunities to discover which approaches might help in stressful situations, and which approaches were not helpful. Others discuss how prior experiences prepared them for the earthquakes.

C113: I didn't have too much of a problem with the aftershocks, again as someone who has worked in emergency management I knew what to expect, an earthquake of that size was going to generate a lot of aftershocks, there would be no pattern to them, there would be a lot of them, even a magnitude five wouldn't bother you...I knew what was going to happen as opposed to other people who hadn't studied earthquakes, there's a lot of uncertainty with aftershocks, it's something invisible too.

I: So we talked about your greater sense of connectedness to other people, have you noticed any other personal strengths develop or come out of the woodwork?

C146: Generosity. Virtues Project, a course I did years ago about developing character strength like generosity or patience and identifying a strength and putting words around it, what does it actually mean in actions. Those strategies are really helpful, so that's one thing I've done. So you can pull a particular card out, and I pulled patience, and the more I thought about it the more I realised patience, which isn't an obvious one, was actually going to be something that was hugely important.

Experiences of prior earthquakes were often cited as helpful for understanding the Canterbury earthquakes, what to expect, and the appropriate actions to take, and for being calmer during an earthquake.

C141: I think because I had experienced the Inangahua earthquake as a child, I don't think it was as terrifying for me and I was yelling to her as we were getting out the house.



Other participants described prior life stressors as having taught them coping strategies, such as responding to each moment rather than worrying about the future. Prior hardship was described as having given participants strength to deal with earthquakes.

C148: One thing I learned about my heart attack is that you can't if possible let things get on top of you, so in a way it was probably quite good to have that attitude when the earthquakes came along because the whole city was trying to get back to where they were, the day before the earthquake they were trying to get back to where they were the day after. Like we will just fix that and just do that, like my colleague who rushed home to get rid of all the liquefaction. If there's one piece of advice I would have is if it's fallen down just leave it there, it's not going anywhere and work on mitigating your psychological aspects of it rather than trying to get everything back to where it was, it just isn't going to happen.

C175: Also, prior to the earthquake, a couple of years before that, my partner had died and I would say that going through the last eighteen months of life and his death probably was as traumatic as anything that I did and in the back of my mind I go 'well it's not as bad as that'. I sometimes wonder if I became emotionally fit or resilient, I'm not sure.

Some regarded past events as harder than the earthquakes. Past experiences were described as leading to aspects of posttraumatic growth in the past, such as greater appreciation of life. This pre-existing appreciation was reported to result in no increase in life appreciation as a result of earthquake experiences, because the participant already possessed an appreciation for life.

C116: I had just sold my business in the January before the February quake, and that had been a major stress for me. I had a business partner that I couldn't rely on, who was a drinker, so for all those reasons, after two or three years of feeling quite burdened and unable to determine my future, I felt amazingly free, so last year and this year, cutting down from not having a business to just two jobs that I loved, and then just the one job that I like, I just feel a whole lot more energised, in a funny sort of

way, happier and more together. An earthquake is way less stressful than dealing with a drunken business partner.

C155: There is always something you can think is good or nice or whatever, but also some really bad stuff has happened in my life, and I survived it, so I survive stuff, and this was all relative to that, it just didn't feel as bad.

The theme 'Prior experiences as good for coping ability in the earthquakes' covered descriptions of previous experiences giving participants knowledge or skills to cope with their earthquake experiences. Prior experiences included formal training for emergencies, previous earthquake experiences, and prior traumas. These previous experiences gave participants expectations of what might happen, knowledge of useful responses, and knowledge of what would help for personal coping. Comparison of the earthquakes to more challenging past events was reported as useful for participants' coping in the earthquakes.

#### *4.4.3.11 See humour or irony*

Thirty-three participants reported seeing humour in their situation. Some joked at the time of the earthquakes, and others found humour in their story afterwards. Some described humour as helpful for coping: for themselves and for others. Humour was used to make light of the situation and to connect with others. Irony gave a sense of the ridiculousness of the mismatch between different elements of an extreme situation.

C109: I was just wobbling everywhere and couldn't walk and fell over quite heavily on the left hand side. And a young chap driving past in a car, he stopped and came running over and picked me up. And he said 'This is a biggy' and I looked up and I realized, that's when I realized that it was an earthquake. He said 'Where's your car, I'll drive you back to your car'. I got in his car and I'll always remember he said to me... 'Put the seatbelt on' and I really wasn't listening, I wasn't processing very well, and I heard him say again more firmly and more commandingly, 'Put your seatbelt on'. And I remember thinking, 'What a strange thing to say' (laughs). We've just been in a huge earthquake.

C116: February was the most traumatic. We didn't have to deal with liquefaction, so when we set up our shower under the garage, I called it the [Suburb] Spa and I had a mannequin and I had her dressed like a girl from the body place, holding a white towel and a little blackboard saying 'for mud services go to [a suburb affected by liquefaction]', which is probably unkind to people in [that suburb], but it made the neighbours laugh as they came to get their shower.

C179: I went off the hot mix into the shingle...and straight up to my thigh in liquefaction. I said to [my partner] 'don't follow me', but she had because she was worried, and I yelled at her to get a pole from the garage because I had to pull myself out. Having been put in quicksand in my army training, I knew that was not so good because if another quake occurred I would go straight down. In five thousand years' time when anthropologists and archaeologists are looking at it they would say 'why did they bury that little bugger with his arms in there?'

I: So that's what went through your mind?

C179: Absolutely. It's really funny. I tend to have that sort of response to the thing.

Humour was identified by some as helpful for relieving stress and coping.

C155: My sense of humour [helped me get through]...I deal with stuff that's bad through humour. Not always, it's not appropriate always, but given half a chance and I will find something about it to laugh about, even if it's really off colour and you wouldn't do it outside with people who didn't understand and know what was funny about it. I have a very black sense of humour and a very ready sense of humour, I would say...Well you can laugh or cry and I know which one I would rather do.

In summary, humour relieved stress and provided a way to connect with others and boost mood. Making jokes and seeing irony in circumstances allowed participants to make light of otherwise serious situations, giving a sense of relief. Humour was perceived as a more attractive response to a stressful situation than responding with despair or distress.

#### 4.4.3.12 *Committed to Christchurch*

Sixteen participants described a commitment to staying in Christchurch, despite at times considering the option of moving away. Largely the decision to stay in Christchurch related to having family or close friends in the city, which participants valued over moving to another centre without ongoing aftershocks and earthquake damage. It was acknowledged that uncertainty is part of life and that moving out of Christchurch would not guarantee other difficulties would not occur.

C117: At the time I remember being so glad we lived in a place with family and friends and lots of people around and lived with community. I work for a community group so I do volunteer work for the community so I knew enough people around. I felt that I wasn't alone and that's one huge reason when my husband was made redundant, he said 'Let's go to Auckland or Dunedin', I said 'I don't know anyone in Auckland or Dunedin', and that was my major thing, 'What if we go there and there's a big earthquake, we will have no one, we will be strangers in a strange place, we will have no help, we'll have to do everything ourselves.'

C210: I feel a strong sense of us, which I probably have always felt because I am an adopted Cantabrian so I chose to live here, I wasn't born here.

#### 4.4.5 *Life philosophies*

Table 11 outlines the subthemes under the broader theme 'Life philosophies' and their frequencies.

Table 11

*Frequency of subthemes in 'Life philosophies'*

Theme	Number of participants reporting theme	Percentage of larger theme
It is what it is	47	39%
Prioritise actions according to your values	33	31%
Don't worry about	29	19%

The themes 'It is what it is' and 'Don't worry about uncontrollable things' express components of the posttraumatic growth already identified in Calhoun et al.'s (2010, p. 6) model: "Acceptance of 'changed' world". The theme 'Prioritise actions according to your values' sits with Joseph and Linley's (2005) organismic valuing theory of growth through adversity, where an individual acknowledges their needs and works to meet them. This theme expands on the understanding of acknowledging one's own needs, to include considering one's own value system and acting in accordance with this. Such a theme speaks of authenticity to oneself.

#### *4.4.5.1 'It is what it is'*

An attitude of acceptance was specifically expressed by 47 participants, through use of phrases such as 'that's just the way it was', 'c'est la vie', or a description of events as 'just part of life'. Some described a sense of fatalism, whereas others acknowledged difficult and pleasant events as part of the fabric of human experience. Change, death, and unpredictability were accepted as inevitable. Acceptance could be included as a component of the organismic valuing process (Joseph & Linley, 2005), where participants strive to meet their needs and accept the reality of their situation.

C103: You just get on with it. It was a bit confusing, because you didn't always know which way to take, but the bosses were well aware of the situation and we always made sure we left in as much time as the children would allow us to leave in, because children can be diabolical in the morning, especially if something is on telly. Otherwise it was just one of those things.

C210: ...when I saw the ducks after the February [earthquake], they were quite important to me because I thought 'this is something that happens, the earth goes up and down and the ducks continue feeding'.

Some linked their acceptance of circumstances to their decision to continue with their lives nevertheless.

C117: I didn't understand the people who said they were never going to the city again. It's why on earth would you live in this suburb all your life and never go out again. To me, even though something might happen, I guess I'm just a believer that you have just got to. I mean I don't like flying but I fly all the time but I just grit my teeth and do it because it's stupid to have it control you.

Others described an acceptance of both difficult and pleasant experiences as part of life.

C175: A family friend, a woman who is in her eighties who lives in... northern England and had been through the blitz, she got hold of me. How that woman did that I have got no idea, I wouldn't have thought she had a lot of coping skills but she did, she tracked me down and she said to me 'it's just like the blitz, you don't know when the next bomb is going to hit, you think you are safe and it's gone. You think you are going to go and have breakfast or you are going to make something for tea and that day never ends like that', and I thought it was a great analogy. It also made me think about a whole generation, millions of people. No use feeling sorry for yourself in Christchurch, it's part of the world we live in.

One participant linked acceptance of difficulty with comparing circumstances favourably to those of others.

C122: You put things on the timeline and it seems to stretch out further and further there's nothing you can do about it, you have got to be philosophical and accept that there are a hell of a lot of other people who are in way worse situations.

Participants described accepting the reality of death as a part of life.

C197: A [previous] student [and a colleague] of mine [died]. She used to work at the University and she would invite me over to do some guest lecturing for her, she was a lecturer, and we would go out for coffee. I found out the night of the earthquake, my boss rang me to check if I was OK, and how things were going, and she mentioned that [my colleague] had died.

I: How has that affected you?

C197: I was really sad at the time, and sad thinking about it now, but it was OK, there were lots of other things going on. It was kind of like just one of the other things that happened, there were a lot of people that died.

Some linked their acceptance to values from their culture or upbringing. They referenced parents' values, cultural values, or religious values as enforcing a sense of fatalism or as encouraging a view of the world that acknowledges good and bad events will happen.

C132: Where I was born, part of the culture, was this idea that it's either your time to die or it's not your time to die, and that if it is, there is nothing you can do about it, a sort of fatalist kind of view, and if it isn't, then you don't need to worry about it because you are as safe as houses. While again, I wasn't aware of enacting it, or having that in my head, again on reflection I feel that I acted as if that were the case. Because I thought I went into Latimer Square, and I went into twelve storey buildings and the lift wasn't working and the stairs were broken and I really didn't feel afraid. Looking back I think 'why didn't I?' I should have, and that's the only sense I can make of it.

C198: My parents had suffered quite a bit in particular, when I was young my sister died and so I grew up with this kind of sense that we live and work in a broken world, that bad things will happen that one can't expect life to be easy.

This life philosophy saw participants describe a worldview where both pleasant and unpleasant events occurred, and one should accept both. Participants commonly described responding to earthquake events with acceptance and an attitude that one 'rolls with the punches'.

#### *4.4.5.2 Prioritise actions according to your values*

Along similar lines, thirty-three participants described their priorities driving their actions; they described focusing on essential tasks and choosing to act where they could make an effect or where it would be of most value.

Commonly, participants described focusing on others and family rather than work or possessions. Lost possessions were not mourned in themselves, but memories were treasured and efforts to replace objects were abandoned. The

loss of objects highlighted the people and relationships that remained, that were valuable to participants.

C106: There was one guy with quite a bad injury and it was bleeding quite a lot and I asked him if he needed help and perhaps it would be a good idea if he went hospital, but he assured me that he was OK. He seemed OK to me and he looked like he was under control and the bleeding wasn't too bad and he was on a mission. Other than that the people were OK. For me people were the highest value, are they alright?

C133: Part of it is approach to life that was helped by a Buddhist teacher I had a long, long time ago about simplifying things, and coming back to precursors for anything that you do, which is 'am I doing it for the right reasons?' in other words 'is my intent the right one?', and 'am I doing it to the best of my abilities?' and if you can answer those truthfully everything will fall into place. We all make mistakes and stuff because if you do it to the best of your ability, not perfectly, it just takes a lot of the anxiety out of it because you are grounded in doing it for the right reason as best you can.

#### *4.4.5.3 Don't worry about what you can't control*

Closely related to the theme of accepting that 'it is what it is', twenty-nine participants reported an approach of not worrying about aspects of life that they identified as uncontrollable.

C119: We have had four big ones of these things and it's now nearly a year since the last one and I would be pretty surprised if there was another one, even though I logically know that it's quite possible.

I: There's a lot of uncertainty.

C119: Yes there is but on the other hand what are you going to do, are you going to hide under the bed in the off chance that it happens again, there's nothing you can do.

I: Accepting that it's out of your control perhaps.

C119: I mean a meteor could come through the roof, who knows, it's how people cope, is that they do tend to possibly irrationally discount the chances of it happening again, otherwise they wouldn't cope.



C155: You don't dwell on the things that have gone wrong and you don't dwell on things that are in the past because you can't change them so you get on and make the most of them now.

This choice to not worry about uncontrollable events was tied to acting to make change where change was possible. This included changing one's own response or identifying areas where effort could be made to effect change.

C122: You can't change what's happening, you just have to change the way you accept what's happening and try to move on and perhaps put yourself in a different situation or learn from that experience and know not to follow that road again.

#### **4.4.6 Role to play**

Forty-six participants described an official or voluntary role during the aftermath of the earthquakes. Roles dictated the actions taken by a participant and were described with a sense of responsibility for carrying out tasks. Voluntary roles were described in terms of participants identifying needs in the recovery effort and offering their services to meet these needs. Having a role was at times described in a positive light: as helpful for coping, as a way to make an important contribution to others and to society, as a conduit for connecting with others, and as a source of pride.

Having a role to play combines aspects of posttraumatic growth models. It seems to relate to the active-approach coping described by Schaefer and Moos (1992), which contributes to posttraumatic growth. It also seems to provide a way for individuals to realise their own needs for connection, independence, and competency, as outlined in Joseph and Linley's (2005) organismic valuing theory of growth through adversity . Having a role to play can be more specifically included in models of posttraumatic growth to specify particular paths that facilitate posttraumatic growth.

C134: I'm the eldest of two daughters and not married or anything like that, so I had the position of responsibility so I was always thinking 'OK, how is everybody going to be safe and what will I do if something really bad happens and how will I manage it, and those kinds of things'.

C180: I was wondering about Ilam Homestead, which I'm quite attached to, thinking that had probably had a bit of a battering, which it did, and thinking should I go into town and do my job because [an employer] had

told me after the last earthquake ‘if this happens again, go into town and start [photographing], we aren’t going to call you and we would appreciate the photos and we will sort it all out later’. So I stood outside the cafe with my coffee in my hand thinking I should go.

Having a role was often described as helpful for coping. Participants described being occupied with their role and not having time to worry about other things. Roles helped participants have a sense of contribution, of feeling part of something bigger than themselves.

C132: At the time I thought I was functioning really well, and in some ways again, because I had a purpose I think I stayed very functional, I had a role and a purpose. Maybe you will find that as part of your study, I found that the moment I put my trauma specialist hat on I felt like I was one, and it helped me cope I feel. Looking back I’m not sure I was functioning that well, but at the time I felt I was, but lots and lots of stories of trauma, and again on reflection, I think that was hard, not at the time, again slightly dissociative.

I: Looking back, was it difficult doing that?

C132: Yes

I: But it didn’t feel like it at the time.

C132: No, in fact it felt the opposite, I felt extraordinarily energised, personally competent, but also able to help others. I really felt I was doing something helpful and that helped me... Yes, that’s my job, this is how I can help. I can’t build houses and I can’t get people’s sewerage working, but I can listen, and I think that really gave me a purpose. If I was going to pick one thing, I think that’s how [I coped]. Sometimes I would be listening to somebody and thinking ‘you are helping more than you know. You think I’m helping you but in fact you are helping me’.

C184: I think that to a degree, what had helped me cope, the fact that we were doing something that was far bigger than ourselves and we had a lot to offer in the body recovery phase. Then beyond that we had a lot to offer the wider community because there were so many broken homes and so many damaged people, and we had to be a hub for our builders and offer it professionally, and they were very significant factors... During that initial

phase it was that sense of service [that helped me cope], very much part of the community, and that has contributed in an ongoing basis about the welfare of my work community at Riccarton.

In scenarios where participants took on a voluntary role, they identified needs and used the skills they had to meet those needs.

C182: I thought I would go to the hospital, I'm an ex midwife, I would go and see if I was needed because they would have people who wouldn't be able to get in to get to work, and people had to leave. I didn't know what state the hospital would be in, I thought I would go to the maternity ward and see if I could be of any use. I knew the charge midwife vaguely from many years before and said could I be of any use. I don't think they realised at that point what it was like in town. They had been told it was going to be huge but they had no idea. She asked what it was like and I said it was terrible and there would be hundreds of injured people so if they could put me to use, so they put me to task.

C202: I just know how to take control of a situation, pick out people's skills to who is going to do what, and delegate and get things going, just a copier. So I could see that other people who I expected to take on those roles, because that's what they are trained in, weren't doing what I expected them to do so I thought I had to.

Role was also described as having value, as being an important part of responding to the earthquakes. Pride in one's role was also described explicitly; this seemed valuable when one's role was not understood or valued by others.

C103: I'm proud of what I do because it's a good job and you help people in the minimalist way but it's such an extremely important and emotionally raw time in your lives, and the smallest thing you do or say can make even just the smallest bit of difference, but it can really affect their whole being just for that time.

C184: I really felt like a Kiwi, a New Zealander in the way that I had read about. We were right at the front end of it so you felt like you were engaged in something bigger than yourself, and you are doing a positive thing.

In summary, having a role to play in the earthquake recovery was an important part of coping, maintaining self-esteem, and connecting with others. Role provided a course of action that gave participants purpose and afforded a sense of efficacy. Role also allowed distraction from worry about the effects of the earthquakes, allowing participants to carry on with tasks and to perceive themselves as functional and coping. Acknowledging the value of one's role encouraged pride in one's contribution and a sense of connection to others; this likely played a part in some aspects of posttraumatic growth, such as a sense of increased personal strength and a greater sense of community.

#### **4.4.7 'Not bad'**

Next, some participants reported their state of mind in terms of a lack of negative responses: that they did not feel overwhelmed or traumatised, they did not feel unsafe, that they expected loved ones to be unharmed, and that consequences of the earthquakes would not be dire. An expectation is implied that one might expect to feel bad in such circumstances. In this way, themes of 'not bad' build on the optimistic appraisal noted previously. Perceiving oneself as performing relatively well considering the circumstances may be an aspect of benefit finding that contributes to the posttraumatic growth process. Table 12 outlines the subthemes under 'Not bad' and their frequencies.

Table 12

*Frequency of subthemes in 'not bad'*

<b>Theme</b>	<b>Number of participants reporting theme</b>	<b>Percentage of larger theme</b>
Not traumatised	50	30%
A sense that others and circumstances would be 'ok'	44	29%

##### *4.4.7.1 Not traumatised*

Fifty participants described the absence of feeling overwhelmed or recognition that the earthquakes did not traumatise them. Participants reported that they did not feel

fear, or that they did not mind the aftershocks. Some described carrying on without considering the possibility of fear. Some described feeling safe in spite of probable danger.

C164: I was sitting at my desk when what we consider The Earthquake happened, and it was that feeling this is going to be a big one, and I sat there for a while at my desk and then got under, and was thrown head first a couple of times into the side of my desk, I felt like I was actually going to have to hold on, it wasn't enough to be underneath. Then I didn't have any conscious fear around it, other than the fact that it was happening, I didn't worry that the building was going to collapse or I was going to die or anything like that.

C166: I was concerned, but I certainly don't recall being frightened, and definitely not in fear of my life or anything like that... I don't like the quakes themselves but I don't find them terrifying, but I get on with the next thing when it stops shaking.

Some described this lack of fear in contrast to those around them who appeared to struggle.

C194: Some of them thought they were going to die and that seems to have had a big impact on them. I never for one moment thought I was going to die, I think I'm lucky in that I never think I'm going to die! Some day, but I never had that fear 'I'm going to die', so I think I'm lucky that I don't think like that, because the people who seem to think like that seem to be much more affected, but as a team they got together, worked as a team and put out some information.

Fourteen participants described feeling safe (or not feeling unsafe) in contrast to what could be seen as reasonable fear for one's safety.

C102: Last year I felt a bit tense at times but I'm not worrying about the quakes, I'm not worrying [about] any elevators or buildings or going to a mall, I'm not thinking in terms of 'if I'm here and something will happen, that will be a bad place to be', I just don't really care. I work next door and although it rumbled and there were a lot of cracks, I never felt unsafe. I don't tend to think there is danger, although there might be some.

#### *4.4.7.2 Expect that others and circumstances 'would be ok'*

Forty-four participants described a sense or expectation that others, their loved ones, or their situations would 'be ok'. At times they elaborated on the logic they used to support this belief; elsewhere they described a faith in their loved ones' competence. Often this 'sense' was not related to reasoning at all, but described solely as an intuition.

C106: I noted the cars were more covered with bricks, so there were cars parked all the way down [the street] and just splattered and I wondered whether there were people in them. But there didn't seem to be, I had a sense that everyone was OK.

Participants at times explained their reasoning of their belief that others were unharmed.

C136: I wasn't worried about him because I knew he would be fine because we had actioned a plan in September that in the car he would have all the things he would need to stay overnight if something happened because of the Rakaia bridge so he might not have been able to get across it. I knew he would be sweet, and I was pretty sure everything at home would be sweet because we live on the west and I knew our dog would be fine. My Dad was [in town] I was a bit worried about him and my Mum works at... a childcare centre, and I knew she would be OK and I knew she would be really busy.

C204: Our son was on a sleepover about five minutes' drive away, and the people he stayed with are super-organised, super safety conscious, and I thought 'he will be alright, they will be much more prepared than us'.

Participants also reported expecting that 'things would be ok'; that their houses would be safe or undamaged; that there would be no further earthquakes. Often expectations were not based on any evidence, but on intuition.

C118: [After the February earthquake] I was thinking Sumner will be fine because in the September one Sumner was fine, there was the odd jiggle... we came over Mount Pleasant and I remember we were going down [a local road] and the side of a house had fallen off and you could see into a child's bedroom and there was a mobile hanging inside and I

can remember thinking that wasn't too flash but I still for some reason didn't think Sumner would be, I think it was my way of managing and coping with everything that I could imagine one thing at a time...

One participant described an observed general tendency to expect the best, even against available evidence.

C119: Compared to a lot of other disaster situations, the thing which I find unnerving about this one, is you never know when it's going to be over, you never know if it's over, and I think people tend to forget and tend to think that it's not going to happen again pretty quickly, even against the evidence.

Participants described faith that their housing situations would be managed or solved, that they would be helped, or that Christchurch's infrastructure would be fixed.

C129: There's always been a way out, I've got no money, there's always been some situation, even in this country here because it's so easy. [If you] lie down on the gutter, someone is going to come and pick you up and help you.

I: It sounds like you have quite an optimistic attitude that things will work out in the end?

C129: Yes and they have. Something's happened, should never have done that, or if it's a situation like now, see what's happened now, and where to from here. You can't change that.

C180: I have to say that when we went out with the Student Army there were times when I was looking around those streets thinking 'this is too much to fix, everywhere you look it's broken', every bit of street, every fence, every house was really badly broken. What made me good with the whole thing was I thought 'if I come back here in five years' time, or fifteen years' time it will be resolved, an answer will be found...'

Curiously John Key, who I don't like, coming on TV and saying 'we are with you, we will sort this out, don't worry', I think that really resonated at the time. I thought 'yes, this is the way New Zealand works, we will find a way through this, it will have its grim times', and I think that's the thrust of it. You have got to take a long term view.

Some described choosing to think about their circumstances and the future as if it would 'be ok'.

C182: I didn't at any point feel fearful of the situation or was more shocked thinking, I think within about fifteen minutes we were outside the building so there's no point in thinking about my Mum and daughter, just trust it's all fine until you find out otherwise.

C190: I kept saying to myself 'it's OK, we are going to be OK', like a crazy person... We kept saying 'it won't be as bad as we remember'.

In summary, participants often described an expectation that loved ones or circumstances would be ok. In some cases participants described a line of logical thinking that allowed them to expect safety for loved ones or possessions. Such expectations might be deemed realistic optimism, whereas expectations of good outcomes without any basis might be seen as a more illusory, unrealistic optimism that supported coping at a distressing time.

#### **4.4.8 A sense of burden**

Twenty-nine participants described their experiences using very negative-valence words such as 'ghastly', 'devastating' 'terrible', 'awful', 'very stressful', 'overwhelming', or 'a bit too much'. These descriptions of struggle and at times feeling overwhelmed were noted separately from acknowledging general hardship, as they described a sense of extreme difficulty with circumstances, a sense of not quite coping. Generally this was associated with circumstances or events that passed or were time-bound, such as having to share an office with many other people, having to accept help from others, employment ending, staying in makeshift accommodation, or enduring loud alarms, rather than an ongoing perception of not coping. This burden reflected emotional heaviness and frustration, and difficulty coping with earthquake-related events.

These individuals coping well acknowledge distress as well as positive elements of a situation, indicating again that distress does not have to lead to posttraumatic stress disorder, and can be acknowledged as a response to trauma. Findings fit nicely with Joseph and Linley's (2005) organismic valuing theory of growth through adversity, which outlines that distress after trauma can lead to posttraumatic stress disorder or growth.



C109: It sounds pathetic, I know people have terrible earthquake experiences, but there's always a little thing, you think you're coping really well and you're holding everything together but then all of a sudden you can't find something and it's extremely stressful to, you know, live in this chaos. Not even to have the domestic things organized. So I sort of had vaguely known I'd needed to stay somewhere for a while.

C122: I've had to make myself remember that it's attitude that matters and that I'm allowed to have days where I feel like absolute crap and I've been through periods of feeling really dreadful but I've got through them.

C176: The Salvation Army knocked on the door one day and said 'are you OK', and I just bawled my eyes out, I didn't know what to do. We had no water, no sewer, we had no phone, no power, we had candles, it was beyond explaining.

C208: I was desperately trying to think what was the right thing to be doing now, I just couldn't remember what was I supposed to do, where was I supposed to go, it was all a bit much.

I: Were you aware of your heart racing and that kind of thing?

C208: I wasn't aware of my heart, I was very much aware that I was feeling in shock, feeling that I wasn't quite coping and trying very hard to cope and do the right thing and not being sure that I was. I felt that I was missing things, I wasn't doing things I needed to be doing.

This theme indicated that some of the resilient participants perceived themselves as struggling to cope at some stages after the earthquakes. Although no participants met the criteria for a diagnosis of posttraumatic stress disorder after the earthquakes, it was evident that aspects of earthquake events were experienced as very taxing for some participants at some points in time.

## 4.5 Gender differences in interview themes

### 4.5.1 Gender differences in the frequency of themes

In order to examine whether women and men were more or less likely to refer to particular themes, data were exported from NVivo for the presence and absence of particular themes in each participant's narrative. Such themes included hardship for self and others, strong emotion, burden, improvement, role, life philosophy, and positive appraisal. Data were then tested using  $2 \times 2$  chi-square tests for independence, in order to ascertain when either gender referred to a theme significantly more than expected.

Power analysis indicated that a total of 26 participants was needed to use a chi-square test of independence to test hypotheses at the  $p < .5$  significance level, to detect a large effect size, with one degree of freedom and power of .80 (Aron, Aron, & Coups, 2006). Where there was insufficient power to conduct chi-square analyses, the number and percentage of males and females reporting a theme are reported in Table 11.

Two themes showed a significant difference between genders. Under the theme of 'Knowing what you need', women were more likely to report self-care as helpful for coping. A chi-square test for independence (with Yates' continuity correction) indicated a significant difference between genders for the theme 'Need self-care'. A higher percentage of women (57.6%, 38 participants) reported self-care as useful, whereas 30.3% of men (10 participants) described self-care as useful for coping.

Additionally, women were more likely to report others, and needing to connect with others, as helpful in their coping efforts. A chi-square test for independence (with Yates' continuity correction) showed a significant difference between genders for the theme 'Need others'. In this sample, 81.8% of women (54 participants) and 48.5% of men (16 participants) described others as helpful for coping.

There were no significant differences in the likelihood that each gender reported the other themes examined. Themes are listed in Table 13 with corresponding chi-square values, levels of significance ( $p$  value), and effect sizes (phi value). Cohen's (1988) criteria are phi coefficients of .10 for small effect, .30 for medium effect, and .50 for large effect.

Table 13

*Themes examined for gender difference in frequency referenced, chi-square values, significance, and phi effect size (n = 99 and df = 1)*

Theme	Percentage male endorse	Percentage female endorse	$\chi^2$	<i>p</i> value	$\phi$
<b>Improvement</b>					
Appreciate the present more	42.4% (14)	65.2% (43)	3.77	0.05	-0.22
Better relationships	27.3% (9)	45.5% (30)	2.33	0.13	-0.18
Greater sense of community	66.7% (22)	59.1% (39)	0.43	0.51	0.09
Self as stronger	39.4% (13)	62.1% (41)	3.71	0.05	-0.22
Spiritual change or solidification	3.0% (1)	24.2% (16)	-	-	-
<b>Optimistic, positive appraisal</b>					
Appreciate others' input	66.7% (22)	75.8% (50)	0.52	0.47	-0.10
Committed to Christchurch	15.2% (5)	16.7% (11)	-	-	-
Count your blessings	81.8% (27)	90.9% (60)	0.96	0.34	-0.13
Knowing what you need	93.9% (31)	98.5% (65)	0.39	0.53	-0.13
<i>Subthemes</i>					

<i>Need exercise</i>	39.4% (13)	28.8% (19)	0.70	0.29	0.11
<i>Need the familiar</i>	15.2% (5)	10.6% (7)	-	-	-
<i>Need 'home'</i>	3% (1)	30.3% (20)	-	-	-
<i>Need others**</i>	48.5% (16)	81.8% (54)	10.25	.00	-0.35
<i>Need self-care*</i>	30.3% (10)	57.6% (38)	5.51	0.02	-0.26
<i>Need to keep busy</i>	33.3% (11)	25.8% (17)	0.31	0.58	0.08
<i>Need to look for the positive aspects</i>	6.1% (2)	19.7% (13)	-	-	-
Lucky compared to others	42.4% (14)	59.1% (39)	1.83	0.18	-0.16
Lucky compared to what might have been	33.3% (11)	39.4% (26)	0.14	0.71	-0.06
Positive sense of self	66.7% (22)	68.2% (45)	0.00	1.00	-0.02
Prior experience as good for current coping	39.4% (13)	34.8% (23)	0.05	0.83	0.05
Learn from experiences	36.4% (12)	33.3% (22)	0.01	0.94	0.03
See humour or irony	39.4% (13)	31.8% (21)	0.27	0.60	0.08
See opportunities	42.4% (14)	37.9% (25)	0.05	0.83	0.04
View circumstances as fun, exciting,	57.6% (19)	50.0% (33)	0.25	0.62	0.07

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interesting, an adventure					
<b>Not bad</b>					
Expect things will be ok	33.3% (11)	34.8% (23)	0.00	1.0	−0.01
Expect others will be ok	18.2% (6)	18.2% (12)	-	-	-
Not traumatised	42.4% (14)	54.5% (36)	0.85	0.36	−0.11
<b>That's just the way things are</b>					
Acknowledge an extraordinary event	57.6% (19)	63.6% (42)	0.13	0.72	−0.06
Acknowledge hardship for others	87.9% (29)	90.9% (60)	0.01	0.91	−0.05
Acknowledge hardship for self	100% (33)	98.5% (65)	0.00	1.00	0.07
Experience strong emotion or shock	81.8% (27)	87.9% (58)	0.26	0.61	−0.08
Uncertainty	51.5% (17)	50.0% (33)	0.00	1.00	−0.01
<b>Life philosophy</b>					
Don't worry about what you can't control	21.2% (7)	31.8% (21)	0.75	0.39	−0.11
It is what it is	42.4% (14)	48.5% (32)	0.13	0.72	−0.06

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Prioritise time and energy according to values	24.2% (8)	37.9% (25)	1.28	0.26	−0.14
<b>Role to play</b>	37% (17)	30.2% (16)	0.25	0.62	0.07
<b>Burden</b>	18.2% (6)	39.4% (26)	3.61	0.06	−0.21

\* = significant at  $p < .05$ , \*\* = significant at  $p < .01$

#### 4.5.2 Gender differences in the proportion of speech related to each theme

Women were more likely to report the subthemes of ‘Need self-care’ and ‘Need others’, under the theme of ‘Knowing what you need’. This theme was examined to ascertain whether men and women spent differing proportions of their narrative on the theme. Data were exported from NVivo for each participant to indicate the percentage of their narrative allocated to the theme ‘Knowing what you need’.

Power analysis indicated that for a theme where both male and female groups had more than 26 participants endorsing that theme, power would be sufficient (80%) to detect a large effect size ( $d = .8$ ) using a two-tailed test at the  $p < .05$  significance level (Aron et al., 2006). The theme ‘Knowing what you need’ met these criteria, with 31 males and 65 females endorsing the theme.

The theme was examined for normality of the distribution. The distribution of the percentage of the narrative reflecting the theme ‘Knowing what you need’ was examined, using data for kurtosis and skewness to calculate a  $z$  score. Skewness divided by standard error of the skewness gives a  $z$  score for skewness, and kurtosis divided by standard error of the kurtosis gives a  $z$  score for kurtosis. Normality of distribution for the current sample size is indicated if both  $z$  scores are under the value 1.96 and over the value  $-1.96$  (Ghasemi & Zahediasl, 2012). Percentage coverage of ‘Knowing what you need’ was not normally distributed for males and females, as shown in Table 14.

Table 14

*Skewness, kurtosis, and  $z$  scores indicating normality of distribution for the percentage of participants’ narratives reflecting the theme ‘Knowing what you need’*

Theme	Skewness (SE)	$z$ score skewness	Kurtosis (SE)	$z$ score kurtosis	Normality of distribution
Knowing what you need					
Male	.35 (.42)	.83	-.51 (.82)	.62	Normal
Female	1.02 (.30)	3.42	.22 (.59)	.38	Non-normal

Percentage of the narrative reflecting the theme ‘Knowing what you need’ for men and women was compared using the non-parametric Mann–Whitney  $U$  test.

Homogeneity of variance was examined using a non-parametric Levene’s test. This involved calculating ranks within the sample and the absolute distance of each rank to the mean rank of each group. Absolute distances were then compared across groups using a one-way analysis of variance, which indicated no significant difference between variance in each group.

The theme ‘Know what you need’ was expressed in women’s narratives at a significantly higher percentage ( $Md = .087, n = 65$ ) than in men’s narratives ( $Md = .083, n = 31$ ),  $U = 748, z = -2.03, p = .04, r = .21$  (a small to medium effect size using Cohen’s (1988) guidelines of .1 = small effect and .3 = medium effect). However, using the statistical program G\*Power (Faul, Erdfelder, Lang, & Buchner, 2007), a post-hoc analysis was conducted to detect the sample sizes needed in each group to detect a medium effect size (in lieu of a large effect size), at 0.8 power and with  $p < 0.5$ . This analysis indicated that sample sizes needed to be larger than the current sample ( $n_1 = 43, n_2 = 91$ ). Therefore these results need to be interpreted with caution.



## 4.6 Discussion

Ninety-nine Christchurch residents were interviewed who were coping well 2 years after being exposed to major earthquake-related events, such as witnessing falling buildings or seeing bodies, physical injury, death of a loved one, financial hardship, property loss, or housing problems. Themes found across interviews reflected a recounting of events as extraordinary and uncertain, entailing aspects of hardship for participants and others. Participants described aspects of posttraumatic growth. Themes illustrated some positive appraisal of events and noted an absence of distress in some circumstances where others were very distressed. Finally, some participants noted moments of burden, where they felt weighed down by their circumstances. In describing themes, it is apparent that many themes inform other themes; for example, acknowledging the hardship others experienced can engender a sense of one's own 'luck', encouraging an increased appreciation of life and an examination of the meaning of this event for one's own beliefs and philosophies.

Most themes fit with constructs that previous research and theory have suggested are associated with posttraumatic growth, such as optimism, distress, challenges to worldviews, self-efficacy, acceptance, and responding actively to problems. Specifically, the themes 'Positive, optimistic appraisal' and 'Not bad' appeared to relate to optimism, and 'Acknowledge hardship for self' and 'Acknowledge hardship for others' appeared to correspond with distress and inform greater appreciation of life. The theme 'Knowing what you need' related to self-efficacy, in that participants took measures to look after themselves, with the attitude that their actions would be effective and that the self was worth nourishing. This theme can also be likened to Joseph and Linley's (2005) organismic valuing theory, where individuals have an inbuilt instinct of how to go about meeting their goals for relatedness, autonomy, and competence in order to cope with adversity and gain fulfilment. 'Life philosophies' related to acceptance in the face of hardship, and 'Role to play' related to acting to solve problems.

Findings from the current study confirm that the process of coming to terms with a potentially traumatic event and seeing possible posttraumatic growth emerge from one's experiences is not simple. Themes are intertwined in both positive and negative ways. For example, taking action to help others can have many repercussions: a greater connection with others, a sense of compassion, pride in one's role, and a sense

that the helped are helping the helper. Uncertainty can feel uncomfortable and it can also trigger new ways of thinking about events (acceptance) or new ways of taking actions (acting where one can make an impact). As such, simply experiencing uncertainty may be enough to trigger the process of posttraumatic growth.

Some themes identified in the current study are similar to those identified by Rowney et al. (2014) after the September 2010 earthquake (with no loss of life), but before the fatal February 2011 earthquake. Specifically, themes in letters from Christchurch residents were fear, anxiety, sleep problems, hypervigilance, being in limbo, guilt, tending to others, and a sense of excitement. Participants in Rowney et al.'s study reported coping through religion, positive thinking, and being prepared. They also described a 'silver lining' in their experiences: a sense of community spirit, re-evaluating priorities, and in some cases more paid work. The current study assessed descriptions of posttraumatic growth in a sample of individuals coping well after the fatal February 2011 earthquake. It expands on themes of posttraumatic growth, adding improved relationships, a perception of the self as stronger, appreciating the present more, and spiritual change. Additionally, the current study examined how other themes were perceived by participants to contribute toward posttraumatic growth, and this showed that aspects of earthquake experiences, such as having a role to play and positively appraising the self, others, and circumstances, likely all contributed to posttraumatic growth.

Each theme of the current study will now be explored and compared to current models, theory, and research on posttraumatic growth and its known correlates such as optimism. In particular, the findings will be considered in the light of Calhoun et al.'s (2010) model of posttraumatic growth, which posits that a potentially disruptive event challenges an individual's worldviews, beliefs, or goals. In response to this challenge, emotional distress is triggered. This leads to reflective rumination and efforts to reduce distress. Intrusive rumination may occur soon after the trauma and later transform into more reflective rumination (a deliberate search for meaning, reappraisal of the trauma, and analysis of the new situation). Emotional distress may then decrease and the individual may abandon unattainable goals. Themes will also be examined for compatibility with aspects of Joseph and Linley's (2005) organismic valuing theory of growth through adversity. This theory outlines how distress after a trauma can lead to a) posttraumatic stress disorder if an individual has difficulty processing distress; b) a return to pre-trauma functioning if an individual can

cognitively and emotionally process distress but not find positive meaning in the trauma; or c) posttraumatic growth if the trauma is processed cognitively and emotionally and positive meaning is found. An innate drive toward posttraumatic growth is assumed. An instinct toward knowing how to meet one's needs of autonomy, competence, and relatedness (the organismic valuing process) guides an individual to respond to events in the most beneficial way for them, if the individual is in tune with this instinct. Where appropriate, the Janus-face model of posttraumatic growth will also be considered. This model posits that posttraumatic growth has two components: a more constructive side, where perceptions of personal growth are realistic, and an illusory side, where perceptions of growth are self-deceptive and allow an individual to counter negative affect. The illusory side and the constructive side are theorised to emerge at different stages after an adverse event: the illusory side emerges soon after a trauma and relates to efforts to rally oneself and possibly to denial, whereas the constructive side emerges later and relates to positive adjustment and adaptive effects (Maercker & Zoellner, 2004).

#### ***4.6.1 'That's just the way things are'***

The subthemes under 'That's just the way things are' give context to the immediate distress and ongoing nature of disruption and emotional distress for individuals coping well after earthquake experiences. Emotional distress is included in the comprehensive model of posttraumatic growth set out by Calhoun et al. (2010) and is described in Joseph and Linley's organismic valuing theory of growth through adversity (2005). In the current study, elements of distress are described in the themes of a) the experience of strong emotion or shock, b) the hardship generated for participants and others, c) the unusual nature of the events, and d) the uncertainty associated with ongoing aftershocks and difficulties with housing and authorities. Such themes provide further details for the kinds of distress that can accompany posttraumatic growth and that, in this sample, contributed to higher levels of posttraumatic growth, as found in Study 1.

Illuminating the nature of immediate distress in response to earthquake events, the theme 'Experience strong emotion or shock' speaks to experiences of intense emotional reaction or an awareness of shock. Participants described being scared, frightened, alarmed, dazed, and shocked. Such descriptions are consistent with experiences of peritraumatic distress where fright and terror are experienced. Feeling

dazed and in shock may also relate to dissociation or derealisation, where participants acted in what they described as an automatic way while feeling removed and emotionally detached from events (Sierra, David, & Hunter, 2004). In the light of Joseph and Linley's organismic valuing theory of growth through adversity, this dissociation allows individuals to manage their emotions while attempting to process their trauma cognitively and emotionally. It is likely that the shock participants described allowed them to continue functioning and complete necessary tasks for survival. Such dissociation is part of the trauma experience that can lead to posttraumatic stress disorder if problems with processing a trauma cognitively and emotionally arise, but can also lead to posttraumatic growth where cognitive and emotional processing are unhindered.

The theme 'Acknowledge hardship for self' illustrates clearly that ongoing disruption and distress occurred after the earthquakes in the form of difficulties with housing and authorities, financial and work difficulties, and strained relationships with others. This immediate and ongoing hardship is unlike a difficult single event. The model by Calhoun et al. (2010) outlines that emotional distress informs every part of the posttraumatic growth process. The current study shows that ongoing difficulties likely influence the posttraumatic growth process, through providing ongoing disruption that needs continued cognitive and emotional processing by individuals. It is possible that such ongoing difficulties produce different kinds of posttraumatic growth than may emerge from a discrete trauma such as an assault. This hypothesis warrants further research.

The theme 'Acknowledge an extraordinary event' entails participants identifying events as particularly unusual, 'surreal', 'movie-like', and separate from everyday life. It is possible that such descriptions enable participants to distance themselves from the intensity of the immediate earthquake experience and may relate to some sort of dissociation from the intensity of experiencing an earthquake. This sense of being slightly removed from the earthquake experience could enable individuals to retain a sense of a 'normal' stability that has been interrupted by an 'out of the ordinary' event, and may also support a sense of expectation that 'normality' will return. Such a response could relate to attempts to manage potential emotional distress in the immediate wake of the trauma, as outlined in Calhoun et al.'s (2010) model of posttraumatic growth. Earthquakes were described as a 'once in a lifetime' event, and as a defining event in lives and history: 'like Princess Di dying, September 11, moon

landings'. Such descriptions lend a significant weight to earthquake experiences, and point to the 'watershed' nature of potentially traumatic events where individuals often describe their lives in the framework of what happened *before* the event and what happened *after* the event (Tedeschi & Calhoun, 1995). Such events can be traumatic but can also spark posttraumatic growth, as individuals struggle with the outcomes of an event and process the meaning of the event in their lives.

The themes 'Acknowledge hardship for self', 'Experience strong emotion or shock', and 'Burden' indicate that participants were not denying reality and downplaying their difficult experiences, as has been proposed (Lazarus, 1983). Most participants were adversely affected by the earthquakes, describing earthquake-related events such as witnessing fallen buildings and seeing bodies, having difficulty getting home and problems contacting loved ones, losing loved ones, suffering damage to or loss of their homes, and having ongoing trouble dealing with insurances companies and the EQC. Findings of the current study also do not lend support to the illusory component of the Janus-face model of posttraumatic growth (Maercker & Zoellner, 2004), which is theorised to be self-deceptive and may serve to ease distress in the short-term. Maercker and Zoellner regard the illusory side of posttraumatic growth as an acute coping effort not necessarily related to denial or avoidance; however, where posttraumatic growth is expressed as wishful thinking or a desire to avoid thinking about a difficult event, they propose that this is problematic in the long run as it prevents processing of the potentially traumatic event. In the current study, it is clear that participants did not deny the hard reality of their situations and also did not suffer significant psychological difficulties, but it is not possible to draw inferences from these facts because of the cross-sectional nature of the research and the fact that participants were recruited as resilient participants. It would be of interest to compare the current sample to another with psychological difficulties after the earthquakes, to examine whether psychological difficulty is associated with greater posttraumatic growth and denial. The timing of the current study, 2 years after the major earthquakes, suggests it is unlikely that posttraumatic growth expressed in the sample was an acute coping effort for immediate hardship. In regards to the ongoing difficulties associated with housing, bureaucracy, and damage to the city causing distress to participants, it is possible that posttraumatic growth may have played a role in easing this distress, but again it does not equate to denial of ongoing hardships.

The theme ‘Acknowledge hardship for others’ was often used to frame the self as fortunate, by way of perceiving one’s own position as relatively positive; this is similar to research with tsunami survivors, who reported a similar sense of ‘luck’, through comparing self to others in less fortunate circumstances (Teigen & Jensen, 2011). This is further elaborated in the theme ‘Lucky compared to others’.

Acknowledging others’ difficulty was also a trigger to help others; appreciate others’ situations; and have compassion for them. Compassion for others and helping others was described by some participants as leading to perceived posttraumatic growth in regards to better relationships, a greater sense of community, and a sense of a personal increase in compassion. Participants built the self up through building others up, as noted by one participant working in a helping profession: ‘You think I’m helping you but really you’re helping me’. A sense of efficacy and usefulness was gained from helping roles, likely providing opportunities to reinforce a more positive sense of self (Collins, Glavovic, Johal, & Johnston, 2011), contributing to posttraumatic growth in the domain of Personal Strength. Comparing oneself favourably to others likely influences the reflective rumination component of the posttraumatic growth process as described in Calhoun et al.’s (2010) model, which allows an individual to perceive the present and life as more fragile and therefore more valuable. Perceiving oneself as lucky is an example of positive reappraisal, which is a cognitive strategy that has been found by some researchers to relate to posttraumatic growth (Helgeson et al., 2006).

Considering Joseph and Linley’s (2005) theory, acknowledging others’ difficulties provides context for one’s own difficulties and contributes to the search for the personal meaning of a trauma. Different interpretations of the same acknowledgement lead to different outcomes. If an individual considers that their experience could have been worse because others are worse off, and then focuses on the terrible repercussions of the earthquake sequence for everyone, this has a depressive effect. If an individual considers that their experience could have been worse, and then considers themselves *lucky*, this is more likely to lead to greater appreciation of life and the relationships one has, which is an example of posttraumatic growth. The role of positive appraisal in posttraumatic growth in this study will be further discussed under the discussion heading ‘Optimistic, positive appraisal’.

#### **4.6.2 *Improvement and posttraumatic growth***

The themes of posttraumatic growth from the current study fit with previous research and theories that posttraumatic growth is commonly expressed as positive change in the self, in relationships with others, and in one's philosophy of life (Calhoun et al., 2010; Tedeschi & Calhoun, 1996). Themes describing posttraumatic growth in the current study were 'Better relationships', 'Greater sense of community', 'Self as stronger', 'Appreciate the present more', and 'Spiritual or philosophical change'. The theme 'See opportunities' describes participants identifying personal opportunities that had arisen because of the earthquake sequence, and opportunities for Christchurch to be rebuilt in an exciting, aesthetically pleasing way. The theme 'See opportunities' thus expresses a component of the New Possibilities domain of posttraumatic growth (which emphasises new roles and relationships), along with the theme 'Better relationships', where new relationships were formed because of the earthquakes.

Themes described in the current study are akin to descriptions of posttraumatic growth in other studies after different types of trauma (Calhoun & Tedeschi, 2004; Hefferon et al., 2009); however, in the case of earthquake trauma in the current context, the theme 'Greater sense of community' was also widely endorsed, illustrating a greater possibility for bonding with others after a shared trauma.

Increased appreciation of life was expressed by participants as a heightened enjoyment of the present, a greater sense of gratitude for others, and a desire to capitalise on the experiences of the moment. For participants who expressed this theme, the earthquakes were a reminder of the fragility of life and a reminder that one was fortunate compared to others or compared to what might have happened. The themes 'Lucky compared to others' and 'Lucky compared to what might have happened' expand on this. Thus, in models of the posttraumatic growth process, two aspects might be added: the role of downward comparisons (seeing oneself as fortunate) in cognitive and emotional processing leading to the positive appraisal of one's circumstances, and the particular role of reminders of the fragility of life in encouraging the posttraumatic growth domain of increased appreciation of life. In this way, it is indicated that positive appraisal should be added to models of the posttraumatic growth process, as it has been described as leading to posttraumatic growth in the current study.

Behavioural changes were also made in regard to increased appreciation of life, such as making more effort to look after oneself or buying fewer possessions. Behavioural changes are examples of participants making outward changes that reflect inward psychological changes and posttraumatic growth. Some argue these behavioural changes signal 'true' posttraumatic growth (Hobfoll et al., 2007). There are also other reports that illustrate psychological work that is considered by Johnson et al, (2007) as actions taken in cognitive and emotional realms, and also can reflect 'true' posttraumatic growth. Such evidence is seen when participants describe themselves as having greater insight into their own nature after observing their reactions and actions to the earthquakes. Findings do not support theories (Taylor, 1983) that posttraumatic growth is an illusion that helps with coping.

The theme 'Self as stronger' saw participants describing an increased sense of self-efficacy as a result of experiencing the earthquakes, with many reporting 'I know I can cope now.' The earthquakes were seen as a test of one's character so that, if the test is passed, one could be more confident of handling future disasters competently. This theme also related to themes of past experiences being harder, where participants often reported feeling strong prior to the earthquakes, but that the earthquakes extended this sense of personal strength. This is in agreement with the theory that tough experiences, where individuals feel capable, lead to better future coping (Connor & Davidson, 2003). Participants also reported an increased understanding of themselves and a greater sense of compassion for others, which may overlap with a greater appreciation of life. Such descriptions correspond to common reports of posttraumatic growth involving recognition of one's strengths and resources, illustrated in the comprehensive model of posttraumatic growth (Calhoun et al., 2010).

'Better relationships' involved increased intimacy with loved ones as a result of enduring hardship together, and a re-evaluation of current relationships: investing in valued relationships and abandoning more damaging relationships. Related, the theme 'Greater sense of community' expressed a sense of solidarity between participants and their friends and neighbours, and those they had interacted with over the course of the earthquakes. The action of helping others or being part of the response to the earthquake generated a connection with others, a compassion for the plight of others, and a sense of being part of a community of people banding together to respond to a common need. Such findings might correspond with and elaborate on research



findings indicating that active responses to hardship contribute to posttraumatic growth (Cordova et al., 2001). The Calhoun et al. (2010) comprehensive model of posttraumatic growth does not specify a role for active coping in the posttraumatic growth process. In the current study, acting to help others was described as improving relationships and thus led to posttraumatic growth.

The theme ‘Greater sense of community’ reflects a different expression of posttraumatic growth after earthquake events compared to research after other individual traumas. This indicates that it is important to consider positive changes occurring in a community as an influence on an individual’s posttraumatic growth. The greater support perceived from a community, which is captured by the theme ‘Greater sense of community’, likely supports further posttraumatic growth, as perceived support from others has been noted in some research to promote posttraumatic growth.

The search for the meaning of a trauma outlined in models of posttraumatic growth (Calhoun et al., 2010; Joseph & Linley, 2005) leads individuals to consider the personal meaning of a trauma for their prior worldviews. Where an individual holds spiritual or religious views, and the traumatic experience is not congruent with spiritual worldviews, views are modified to incorporate the new traumatic experience. Spiritual change was described by a small number of participants in the current study. This theme described participants examining their beliefs and considering how they approached them in light of the earthquakes. Some described a strengthening of previous convictions, whereas others described their beliefs becoming more ‘raw’ and basic; others reported believing less in God and being ‘scientifically thoughtful’ about the earthquakes and their place in life, valuing appreciating the moment in lieu of thinking about a deity. One participant saw a link between increased spiritual sensitivity and increased appreciation of life. Intuitively, it makes sense that gratefulness to a spirit or higher power would occur where a religious or spiritual individual experiences greater appreciation of life after a trauma; this corresponds with research indicating that religiosity relates to more gratefulness in the face of adversity (Rosmarin et al., 2016).

#### ***4.6.3 Optimistic, positive appraisal***

Several themes relating to positive cognitions emerged in the participant data: ‘Count your blessings’, ‘Lucky compared to others’, ‘Lucky compared to what might have

been', 'Appreciating others' input', 'See humour or irony', being 'Committed to Christchurch', 'Prior experience as good for current coping', a 'Positive sense of self', and 'Knowing what you need'. These themes painted the earthquakes, events that ensued, and participants in a generally positive light, yet it is important to note that nearly all participants also acknowledged that real hardship had occurred. The co-activation of negative and positive emotions theory (Larsen, Hemenover, Norris, & Cacioppo, 2003) holds that experiencing both positive and negative emotions after an event aids in cognitive processing to make sense of the event, problem solving, and gaining mastery. Research showing that positive and negative repercussions are reported in the context of posttraumatic growth (Hefferon et al., 2009) is in line with this theory and with the findings from the current study. It is also likely that this balanced appraisal of both positive and negative aspects of the earthquakes provides fodder for reflective rumination that supports an outcome of posttraumatic growth. Such a possibility is consistent with findings from a qualitative study indicating that women who acknowledge difficulties and positive aspects of their trauma report higher levels of posttraumatic growth (Pals & McAdams, 2004).

Findings support the inclusion of positive appraisal or benefit finding in models as an influence in the process of posttraumatic growth in individuals coping well after trauma. Although positive reframing has been found in research to relate to posttraumatic growth, it has not been explicitly included in models of posttraumatic growth. Positive appraisal in the current study could also be considered benefit finding and could illustrate aspects of cognition that encourage the posttraumatic growth process.

For the current study, it is pertinent to note findings indicating that resilient individuals are more likely to experience positive emotions in adverse circumstances, reporting frustration but also emotions such as interest, excitement, and eagerness. These positive emotions enable them to find more positive meaning to their circumstances (Tugade & Fredrickson, 2004). Additionally, experiencing positive emotions in a stressful situation aids in broadening one's focus to consider different possible ways of reacting (Fredrickson, 2004), suggesting that an interplay between positive emotion, openness to experience, resilience, and posttraumatic growth is possible. Thus, models of the posttraumatic growth process need to include resilience as an influence on positive appraisal of a trauma.

Cognitive approaches of positive appraisal were specifically noted by participants to help coping or contribute to posttraumatic growth, including ‘Count your blessings’, ‘Appreciate others’ input’, ‘See humour or irony’, and considering oneself as ‘Lucky compared to others’ or ‘Lucky compared to what might have been’. These are examples of individuals responding to their environments in ways that aid adaption and fulfilment, and thus are examples of ways participants commonly followed their organismic valuing process to meet needs of autonomy, competence, or relatedness. Joseph and Linley (2005) posit that posttraumatic growth is more likely to occur when an individual is following their organismic valuing process, so that they interpret a changed worldview with a positive meaning. Specifically, as an individual is working to find the meaning of a trauma in their life, the organismic valuing process guides them to work to meet their needs, to gain fulfilment. Where an individual is in tune with the instinct of their organismic valuing process and follows this instinct, they know what is needed, and they do what is needed, to cope and meet their needs. The theme ‘Knowing what you need’ is a clear example of individuals following their organismic valuing process in identifying what was needed to help coping, and acting to meet these needs. An example of subsequent positive accommodation of the earthquakes in one’s worldview, resulting in posttraumatic growth, is shown in the current study. The modified worldview that life is more fragile and unpredictable than one thought before the earthquake sequence led to a response that one should live for each day and make the most of each moment. Such a positive change is an example of posttraumatic growth.

Research from other fields of psychology suggests that the uncontrollable nature of an earthquake influences positive appraisal and thus likely influences posttraumatic growth emerging from earthquake trauma. Specifically, where an event is perceived as uncontrollable (a natural disaster), this tends to have expected negative consequences, so that even retelling the uncontrollable event followed by a *neutral* event in a narrative will be interpreted as ‘lucky’. This is more common in circumstances perceived as ‘uncontrollable’ than a ‘chance event’ (e.g., an accident), which could easily *not* have happened, and needs to be followed by a more positive narrative to be considered lucky. Thus, in the context of natural disasters, it is far more common for individuals to use comparisons to suggest their luck than it is in victims of assault, who are more likely to use ‘upward comparisons’ to consider how they might have avoided such a fate (Teigen & Jensen, 2011). The uncontrollable

nature of the earthquake sequence and the nearness of the threat to Christchurch residents may have encouraged the positivity with which participants interpreted their fate in the earthquakes. Positive interpretations of surviving the earthquakes were couched in terms of stories regarding misfortunes inflicted on friends and acquaintances, and the very real possibility that a similar fate may have befallen any individual. The themes 'Lucky compared to others' and 'Lucky compared to what might have been' entailed descriptions of what misfortunes occurred to other individuals and what could easily have happened to participants but did not. Comparing oneself to others or to what might have happened helped participants see their situations in a positive light, reminiscent of studies showing that 'downward comparisons' (comparing oneself to others less fortunate than oneself) help individuals maintain a sense of luck and of positive mood (Taylor, Buunk, Collins, & Reed, 2014; Teigen & Jensen, 2011).

Again, the theme 'Count your blessings' saw participants listing benefits in their situations and often reporting a sense of gratitude. This theme may be related to the constructs of optimism and positive reappraisal, which contribute to posttraumatic growth (Bostock, Sheikh, & Barton, 2009; Helgeson et al., 2006; Prati & Pietrantonio, 2009; Zoellner et al., 2008). Participants described positivity and appreciating how 'lucky' they were as therapeutic and as needed in order to continue with life. As such, positive appraisal was illustrated in participant interviews and also described explicitly as an approach participants took that was helpful:

C121: It's 'glass half full' kind of stuff, you have to weigh up a positive to so many shitty things and say 'at the end of the day I got out and I'm OK'. That overrides everything else; you can't focus on the bad stuff that happened because otherwise you just wouldn't move on.

A pattern of countering a negative fact with a positive element was clear in participant transcripts. The tendency to address the negative but move on quickly to a positive aspect of a situation indicates that participants were not denying negative aspects to their experiences but were framing them in such a way as to have an enduringly more positive view of them. For example,

C186: We have had all the insurance hassles and the house is going to be demolished so I'm not going to be able to live there but the good thing is

they aren't going to pull it down for another year, so we can stay there and it gives you time to find something.

Such speech patterns have been noted to change the way a narrative is perceived: if a negative event is told first, followed by a positive outcome, the message of the story is perceived as lucky because an unfortunate circumstance has been avoided; if a positive element is followed by a negative conclusion, the narrative is perceived as unlucky (Teigen, Evensen, Samoilow, & Vatne, 1999). Therefore, it appears that participants framed events in such a way as to emphasise the positive aspects and portray themselves as fortunate. Findings support the inclusion of positive reappraisal or benefit finding in models of posttraumatic growth.

The theme 'Appreciating others' input' saw participants appreciating the help and kindness of others; admiring friends, colleagues, and strangers involved in the earthquake response; and appreciating workplaces, services, government services, and emergency aid work. Greater appreciation and admiration for others contributed to improved relationships and a greater sense of community. Participants described admiration for their family and partners, which increased intimacy in these relationships. They also described common experiences with others encouraging helping behaviours toward and from others, and this being a reason for appreciation of other people. This theme relates strongly to the theme 'Need others', where participants identified the company of others as important for coping. The theme 'Appreciating others' input' is interesting in light of findings from Study 1 indicating that lower satisfaction with social relationships predicts higher posttraumatic growth. The subscale of the Crisis in Family Systems Scale (Shalowitz et al, 1998), used in Study 1 to measure satisfaction with relationships, included measures of worry about others. This subscale may not reflect actual satisfaction with social relationships in the current study, as it is very likely participants were worrying about ordeals their loved ones were suffering. Findings from Study 2 suggest that participants commonly appreciated those around them and that this was perceived to improve relationships, thus leading to posttraumatic growth.

The ability to 'See humour or irony' has been found to relate to posttraumatic growth, reduced distress (Scrignaro et al., 2011), positive reappraisal, and a problem-solving approach to worries (Lefcourt, 2002). Additionally, where there is a threat to self, humour can aid an individual in decreasing the sense of personal threat and in

attributing causes of the threat to an external force (Abel, 2002; Geisler & Weber, 2010). Humour in the current sample was seen in terms of noting incongruence in a situation (e.g., someone telling the participant to put a seatbelt on after an earthquake, or a family member not being upset by an aftershock because they were jumping up and down, or glasses on a windowsill not falling while every individual was thrown to the floor), self-deprecating humour (amusement at one's own tendencies to walk a distance from tall buildings even when not in danger of aftershocks), making light of possible outcomes (joking about being buried in liquefaction and unearthed by archaeologists in the far future), making jokes, and using humour in connecting with others (such as the participant who set up a 'day spa' to dress up the shower facilities they made available to neighbours). Such examples of humour could be classified as affiliation humour (humour used to connect with others, joke-telling, banter, and self-deprecating humour), or self-enhancing humour (maintaining humour in times of stress and being amused by incongruities of life). Affiliation humour has been noted to relate to relationship satisfaction, extraversion, and positive mood, whereas self-enhancing humour has been found to relate positively to openness and extraversion, and negatively to neuroticism. Humour is also often found to correlate to optimism (Carver et al., 1993); it is likely that humour overlaps with other personality variables, such as extraversion and optimism, and in this way may be an aspect of a response to difficulty that promotes higher posttraumatic growth. Additionally, the current sample suggests that aspects of humour were helpful for coping in ways that connected participants to others, possibly enhancing social support, reducing stress, and lifting mood. Such possibilities are illustrated by the humour that participants reported using in response to stressful events, and that a 'black sense of humour' was a useful coping strategy that could be shared with others and was a privilege of those who had experienced the earthquakes. Humour may be a component of building and maintaining relationships with others that contributes to the Relating to Others domain of posttraumatic growth.

The theme 'View circumstances as fun, exciting, interesting, an adventure' included descriptions of the earthquakes as 'awesome' or 'cool', and of participants experiencing the adrenaline rush from the earthquakes as exciting, fun, and an adventure. These responses suggest that participants may have experienced a similar adrenaline rush to others who were frightened during the earthquakes, but responded to it in a different way, interpreting the sensation as enjoyable rather than disturbing.

Others responded with intellectual interest in the effects of the earthquakes, reporting their interest in how some houses moved different ways, in the damage done to buildings, in researching the mechanisms of earthquakes, and in the different responses of others to the earthquake events. Last, some participants reported relishing the challenge provided by the earthquakes, enjoying opportunities to solve problems and invent different ways of meeting needs. This participant sample brought a sense of curiosity and interest to their situation in lieu of fear or helplessness. These findings are consistent with studies showing that individuals high in resilience are more likely to respond to adverse events with positive emotions as well as stress; they are more likely to describe interest, excitement, and eagerness. Additionally, such positive emotions related to a greater likelihood of identifying positive aspects of a difficult experience (Tugade & Fredrickson, 2004). It is also possible that the participants describing the earthquakes as exciting or fun may have had more of a tendency toward novelty-seeking, and thus respond to unique, adrenaline inducing experiences with excitement and curiosity. It seems that this perspective may have aided participants to keep open to their experiences and discover new possibilities for their changed situations. Levels of novelty-seeking could be explored in regards to response to disasters in future research.

‘See opportunities’ saw participants describe opportunities for Christchurch to rebuild in an exciting, contemporary way suited to modern life and with design influences from New Zealand. Participants described career opportunities presenting themselves because of the different work available after the earthquakes, and opportunities to improve their housing during a house repair. Finally, some participants described the experience of the earthquakes as an opportunity in itself: an extraordinary event that many others will never experience in their lifetimes. Such descriptions reflect open-mindedness about the consequences of earthquakes not necessarily being all negative. Participants showed a willingness to consider possible advantages to the damaged city and their disrupted lives. Initially this theme was considered an aspect of positive appraisal, but in analysis it was noted that ‘See opportunities’ could well relate to the posttraumatic growth domain of New Possibilities as it reflects *new* positive appraisals and opportunities brought about by the earthquakes. Such a conceptual overlap between positive appraisal and improvement might reflect some overlap between aspects of posttraumatic growth and positive reappraisal. ‘See opportunities’ adds a communal aspect to New Possibilities, by participants identifying opportunities

for Christchurch to grow and develop as a city and community. In this way, participants contribute their own posttraumatic growth to the posttraumatic growth of a larger community. Social influences and the influence of proximal culture within Christchurch are illustrated by some participants referring to a greater sense of community spirit as ‘the oft-cited community spirit’, alluding to it being commonly discussed between locals. It is possible that such discussions reinforce a greater sense of community. Additionally, this theme sometimes occurred after a participant described their grief for the loss of Christchurch. It seemed that some countered their sadness with hope for the future of Christchurch, seeing opportunities for beauty and for exciting projects to thrive. As such, participants seemed to use positive emotions to ‘bounce back’ from distress; this is consistent with research indicating that resilient individuals use positive emotions to counter negative affect and regulate emotion; such countering also enables individuals to find meaning in bitter experiences (Tugade & Fredrickson, 2004) and thus may support posttraumatic growth.

The theme ‘Committed to Christchurch’ was reported by participants who had made a decision to stay in Christchurch because it was ‘home’. Such decisions were most commonly made as a result of participants’ social connections and family living in Christchurch, and these connections were of higher importance to family than living in an undamaged city where they did not have these social connections. Some participants also felt a sense of ‘home’ in Christchurch as a city, and an attachment to the way residents had pulled together to respond to the earthquakes. This theme illustrates the importance of social connections, and of a sense of ‘home’ for the wellbeing of these participants. Staying in Christchurch where reminders of the earthquakes were continually present may have also encouraged reflection on one’s experiences, potentially supporting posttraumatic growth.

One-third of participants reported that having experienced prior stressful events helped them cope with the earthquakes, through having learned skills or learned what helped them best cope in difficult times. Some reported prior events being more challenging for them than the earthquakes, and therefore not perceiving much hardship in coping with earthquake-related events. Additionally, some reported viewing troublesome circumstances as useful for the individual, as a valuable learning experience. This theme reflects a general concept of difficult events being a trigger for learning about oneself: what is best for one’s coping and what one is capable of doing under stress. These difficult events can help one cope with future difficulties. One



important factor to note is that participants had experienced events as opportunities to learn and grow in the past and this likely influenced their approach to the earthquakes, supporting a sense of faith in one's own competency and the likely efficacy of one's actions. If participants had perceived themselves as overwhelmed and helpless in response to previous stressors, it may have been less likely they would have approached the earthquakes with confidence in the efficacy of their own responses and actions (Sattler, Kaiser, & Hittner, 2000). As such, perhaps it is helpful for the process of posttraumatic growth that one has an 'approach' stance toward challenges, believing that something can be gained from the struggle that ensues. This is in line with Joseph and Linley's (2005) organismic valuing theory of growth, which suggests that previous experiences of following one's intuition to meet one's needs, and successfully having these needs met, increases the likelihood that an individual will intuitively know how to do this in the face of a new adversity.

Positive sense of self was illustrated in regards to participants displaying an enduring sense of their own capability, calmness, adaptability, or optimism. Such participants commonly referred to past difficulties being the source of learning and strength that gave them ability to cope in the earthquakes. Very commonly, participants would give the message: 'I was already strong, but I feel stronger'. In this sense, it appears that prior difficulties where one can gain a sense of mastery and learning does give individuals resources to draw upon in current challenges. Indeed, the theme of 'past experiences are useful for current coping' supports this interpretation. Participants described learning skills that helped in the earthquakes (such as survival skills learned in formal training), or having gained knowledge about their own coping and the responses that would support coping. A positive sense of one's own coping abilities and resilience, and a positive view of others and of the world influences one's peritraumatic response, emotional and physical experiences, meaning making, and recovery (Simmons & Granvold, 2005). Specifically, individuals with high resilience have been found to experience significantly more positive emotion than those low in resilience, and this positive emotion buffers stress and quickens cardiovascular recovery after a negative emotional event (Tugade & Fredrickson, 2004). Thus, the positive emotions described by participants likely aided in their immediate and ongoing coping in response to the earthquakes. In terms of the model of posttraumatic growth (Calhoun et al., 2010), it appears that in the current study, positive assumptive beliefs about the self were unchallenged and supported, meaning that participants did

not have to reconsider their views of themselves in the wake of the earthquakes; however, a sense of prior personal strength was often reported as augmented. Perhaps a self-concept of competence in some areas existed prior to the earthquakes for some participants, and the novel event of the earthquakes allowed them to test this self-concept and expand it to new arenas.

The theme 'Knowing what you need' shed some light on the kinds of responses that participants knew would support them in their coping, and gave examples of how Joseph and Linley's (2005) organismic valuing process works to encourage posttraumatic growth. Participants described proactively acting to meet their own needs, showing self-awareness, a sense of agency, and a value for the self that allowed them to effectively access what they needed. For example, participants made arrangements to spend time with others because of an awareness that conversations would be helpful, whether about the earthquakes or other topics. This exemplified an acknowledged need for relatedness that a participant was acting to meet. Being around others during earthquakes and aftershocks was noted by many as helpful when those others appeared to be coping well and were acting calmly. Such an awareness of the value of other people may contribute to an increased sense of closeness to others and posttraumatic growth in terms of improved relationships with others. In regards to the model of posttraumatic growth (Calhoun et al., 2010), the theme 'Need others' described being around others who appeared calm and competent as helpful for participants. These positive role models may have also contributed toward posttraumatic growth experiences for participants; as suggested, social support can provide role models for schema change and posttraumatic growth.

Needing self-care speaks to efforts to support oneself rather than reject one's own struggles. Intuitively, this may be an expression of valuing oneself, and it may be related to a positive sense of self. Participants recognised the nature of their physical, emotional, and psychological needs, having faith in their instincts to do so, and they worked to meet these needs. Some research with self-care and health-related behaviours, such as diet control in non-insulin-dependent diabetics, has found that higher levels of self-efficacy are related to more self-care behaviours (Beckerle & Lavin, 2013; Skelly, Marshall, Haughey, Davis, & Dunford, 1995). Additionally, optimism has been noted to relate to taking active steps to protect one's health, as opposed to behaving in ways detrimental to one's health (Carver, Scheier, & Segerstrom, 2010). As such, the belief in one's own ability to perform certain

behaviours and the belief that they will effect change can predict the likelihood that an individual will perform these behaviours. In the current sample, participants were already aware of which behaviours were of benefit to them and may have thus already possessed a sense of knowledge that they could perform such behaviours, and a faith that they would provide relief as they had in the past.

Needing to keep busy and working may be related to problem solving or active coping in response to difficulties. Problem solving has been commonly noted as a likely contributor to the process of posttraumatic growth (Armeli et al., 2001; Cordova et al., 2001; Wild & Paivio, 2003). It is possible that aspects of being active allowed participants to retain a sense of control over some aspects of their lives. One participant discussed the value of seeing the progress in a project making furniture; another mentioned a drive to respond actively to the problems caused by the earthquakes, instead of waiting for someone else to help. Although uncertainty and uncontrollability were features of the earthquake experiences, participants were able to respond by acting in areas where they did have some control. The related theme 'Don't worry about what you can't control' describes recognising where one does not have control of events and relinquishing an idea of control, but also choosing to act where one does have agency. This theme will be further described in the section describing life philosophies.

The theme 'Need home' showed the home as a strong anchor for some participants, as a place to return to, and as a place to create as one's sanctuary. This gave a sense of stability, comfort, and continuity. This theme is interesting in the context of participants experiencing displacement and difficulty with their housing; housing was not solely important for shelter, but had a stabilising effect and helped meet a psychological need for 'home'. In academic literature, 'home' has been described as a place of protection or safety, a place of self-expression, and a place to where memories are attached – a physical environment to which one builds affective ties (Marcus, 2006; Perkins & Thorns, 2001). In an environment where homes were threatened and damaged, it is salient that a sense of home is important for the coping of many individuals. Regaining this sense of stability was a drive for many who found new homes or repaired their damaged homes.

#### **4.6.4 Life philosophies**

In the course of earthquake narratives, participants often described their personal approaches to life and events. Themes in such life philosophies most commonly expressed an attitude of acceptance, illustrated by an attitude of ‘It is what it is’ or ‘Don’t worry about what you can’t control’.

The theme ‘It is what it is’ saw participants describe an acceptance of events as they happened, whether they were experienced as pleasant or unpleasant.

Death, uncertainty, and discomfort were accepted as part of human experience just as much as pleasure and life. A few participants also described a faith in fate or an idea of ‘what is meant to be’ according to a greater plan. This theme likely relates to acceptance coping, where individuals come to terms with adverse events and accept they have happened rather than avoid thinking about them. Acceptance appears to support posttraumatic growth (Helgeson et al., 2006; Kashdan & Kane, 2011; Linley & Joseph, 2004; Znoj, 2006). It is thus likely that this philosophy helped participants process their experiences, which may have resulted in posttraumatic growth. In terms of Calhoun et al.’s model of posttraumatic growth (2010), acceptance of a changed world informs posttraumatic growth; the findings from the current study provide some possible examples of how this might happen: accepting that positive and negative events are part of life may contribute to processing possible meanings of a trauma and may relate to a greater openness to positive outcomes emerging from a trauma, such as increased strength, more resources, or new possibilities. Some participants identified culture or upbringing as an influence on their tendency to accept positive and negative parts of life with equanimity. Such influences can be further explored in future research.

In a similar vein, participants reported an acceptance attitude of ‘Don’t worry about what you can’t control’, where attempts to control the uncontrollable were relinquished and participants focussed their efforts where they could make an impact (as seen in the theme ‘Prioritise actions according to your values’). Such approaches demonstrate both acceptance and efforts to regain realistic control in some areas of life, which gives an individual a sense of agency and may help with recovery from disasters (Collins et al., 2011).

Prioritising actions according to one's personal values reflects a strong sense of identity and self-worth. Individuals knew what they valued in life and acted accordingly. This is another example of following the organismic valuing process (Joseph & Linley, 2005) to guide actions and obtain personal fulfilment.

#### **4.6.5 *Role to play***

Having a role to play was an important theme for this participant sample. Role allowed a purpose, a defined set of tasks the individual was responsible for, and participation in activities where participants felt useful. It also afforded a sense of contribution to others and to the larger community, and a feeling of connection and involvement with the Christchurch community and the wider New Zealand community. Helping the recovery effort in conjunction with others supported a greater connection with others, likely supporting a greater sense of community, as noted by a participant who reported 'we were doing something that was far bigger than ourselves and we had a lot to offer'. A greater compassion for the plight of others, pride in one's role, and seeing a use for one's skills likely support a sense of the self as stronger after the earthquakes. A role also gave an outlet where an individual could take action, have a sense of agency, and strengthen self-confidence. Participants described having a role as helpful for coping, noting 'because I had a purpose I think I stayed very functional'. It seems then that having a role overlaps with the function of acting in response to an adverse event: it is clear what one is expected to do and how to do this. A role may help an individual engage in the 'active coping' that has been noted to relate to posttraumatic growth (Helgeson et al., 2006). The act of contributing to efforts also may have supported a sense of self-efficacy and pride and increased confidence in the self to cope with adverse events. Elaborating on Calhoun et al.'s (2010) model, which indicates that having a role influences cognitive processing, current findings show that positive cognitions about the self, which have been encouraged by acting competently in a role, inform the reflective rumination that can lead to posttraumatic growth.

#### **4.6.6 *'Not bad'***

The theme 'Not traumatised' under 'Not bad' indicates a general lack of distress compared to other people, or compared to a level of distress that might be expected. Such reports are further examples of 'downward comparisons' that allow a participant to perceive themselves in a positive light (Teigen & Jensen, 2011). Some may have

felt safe in one earthquake but not in another; themes have not been compared to ascertain whether this might be the case. However, it appears that where participants do describe being relatively unaffected by earthquakes, they are exhibiting resilience, that they were not traumatised (their experiences did not instil a sense of fear or horror and they did not feel helpless in response to events).

Also under the theme 'Not bad' is the subtheme 'Expect others and things to be ok'. This theme reflects a persistent sense of hope and faith that circumstances would work out for the best and loved ones would be safe. Participants describe reasoning that loved ones would be in a safe place, or that they had the skills to extricate themselves from any tricky situations. Participants also, however, described a simple optimism (without conscious reasoning) that circumstances would work to their advantage. One participant described returning home and seeing the damage to the road and still thinking her house would be undamaged; nearing the house via many damaged houses and still thinking her house would be exempt from damage; entering the house to find the first damaged room and thinking the rest of the house would be in better condition; and so on. This kind of optimism may have been helpful for participants as they responded to immediate needs. Optimism has been shown to reduce negative affect and overall posttraumatic stress disorder symptoms after a disaster (Carver et al., 2010) and may help individuals be more attentive to potential positive outcomes from a disaster. This may contribute to posttraumatic growth; however, in the context of the Janus-face two-component model of posttraumatic growth (Zoellner & Maercker, 2006), is it possible that such a sense of optimism without a logical basis might reflect an illusory sense of optimism that could inform an illusory side of posttraumatic growth, easing earthquake-related distress.

#### ***4.6.7 A sense of burden***

This theme mentioned periods of time or particular events that participants noted as extremely stressful, when they felt burdened by events or when they felt as though they were not quite coping. Burden related to a range of factors: housing difficulties, ongoing aftershocks, difficulty with work, sleep interruptions, ongoing relocations, problems communicating with authorities, lack of essential services, and terror at the time of the earthquakes. A sense of burden was mentioned by 29 participants, whereas 98 acknowledged general hardship (without a feeling of burden). Such a theme is in line with research that shows that both distress and posttraumatic growth can be

outcomes of a potentially traumatic event (Dekel et al., 2011; Taku et al., 2008). It is possible that the heightened distress mentioned in this theme may relate to higher levels of posttraumatic growth, as found in Study 1. This theme indicates that substantial distress did occur at times for some participants in this group. Such findings are in line with the concept of resilience that allows for individuals to be resilient in some circumstances and not in others, and are a reminder that individuals coping well at one stage may have had (quite understandable) moments of weakness at other stages (Luthar et al., 1993).

Overall, the themes in the current study overlap in some areas suggesting perceived causal links. Involvement in the earthquake response effort (whether a formal role or a role adopted by the participant to help their neighbours) gave opportunities for participants to act and to feel a sense of belonging, a sense of usefulness to others, or a purpose, and may have increased a sense of self-efficacy and self-worth.

Participants had opportunities to learn new skills, learn more about themselves, connect with others, and process their experiences alongside others. However, it is likely that self-concept influenced the likelihood of an individual choosing to act in response to the earthquakes – choosing to value their own skills and believe that using them would make a difference to others and the city. Such a positive self-concept probably relates to increased likelihood of being in tune with one's own organismic valuing process (Joseph & Linley, 2005) in a way that encourages posttraumatic growth. To a degree, this may be reflected in some participants' descriptions of 'Self as stronger', where they described themselves as strong prior to the earthquakes, but stronger having experienced the earthquakes. Additionally, it seems likely that individuals with more extravert personality traits might be more likely to immediately choose to involve themselves helping others whether they know them or not. Perhaps this aspect of extraversion indirectly supports posttraumatic growth through higher probability of social contact and more opportunity to gain contacts and develop 'Better relationships' and a 'Greater sense of community'. Individuals who are more introverted may, however, still find a helping role or be allocated a role according to their skills, or may experience posttraumatic growth more in other domains through introspective reflection on the earthquakes

The earthquakes affected a whole city and, although some were more adversely affected than others, they provided a shared experience over which people bonded and empathised with each other. Contact with others also gave information about how

friends and acquaintances had fared; knowing such information was most often interpreted through the lens of ‘luckiness’, showing a tendency to consider oneself lucky compared to those worse off, rather than unlucky to those less affected. Such cognitions contributed to a greater appreciation of the present and of life. Thus, the experience of earthquake events had the potential to build up community and individuals in posttraumatic growth. Importantly, this study found that individual growth related to communal growth through a greater sense of community; this finding adds to current understanding of how posttraumatic growth might differ in nature according to the trauma experienced.

#### ***4.6.8 Gender differences in ‘Knowing what you need’, ‘Need self-care’, and ‘Need others’***

Exploratory analyses were conducted comparing frequency of themes according to gender, and proportion of theme coverage according to gender. Analyses should be interpreted with caution given there was enough power to find large effects, and only medium effects were found. The findings suggested that women spent more of their narrative describing things that were useful for their coping. Women were more likely to specify needing self-care and needing the support of others to aid in coping efforts. No significant differences between genders was noted regarding the likelihood of describing ‘Burden’, indicating that men and women were as likely to report feeling overwhelmed and just as likely to use terms such as ‘horrific’, ‘terrifying’, and ‘awful’.

Taken together, the current study’s findings suggest that men and women were far more similar than different in their perceptions of the posttraumatic process. As such, models of posttraumatic growth apply equally well to men and women. However, as noted in Study 1 and in existing research, gender does influence the extent to which an individual perceives posttraumatic growth and the extent to which different kinds of positive changes are reported.

The limitations, strengths, and future directions for the current study will be discussed in detail in the general discussion, Chapter 5.

#### ***Summary***

The current study describes the nature of posttraumatic growth in resilient individuals after exposure to the Canterbury earthquake sequence. A unique aspect of posttraumatic growth after earthquake trauma was noted, in the form of a greater



sense of community. Themes of 'Optimistic, positive appraisal', 'Life philosophies', and 'Role to play' suggest mechanisms contributing toward posttraumatic growth. They provide examples of how a process such as Joseph and Linley's (2005) organismic valuing process works to guide an individual to respond to events in a way that supports posttraumatic growth.

Descriptions of distress after trauma are consistent with models of posttraumatic growth that posit that distress is part of the process of growth. Descriptions of immediate and ongoing distress from earthquake events demonstrate that different types of distress occur at different times and this likely has an ongoing influence on the posttraumatic growth process.

Last, men and women describe their perceptions of posttraumatic growth in similar ways. Although existing research notes gender as an influence on the extent of posttraumatic growth expressed, themes of posttraumatic growth are described by either gender in very similar ways. Thus, current models of posttraumatic growth apply equally well to men and women.

## **CHAPTER 5**

### **General discussion**

This thesis aimed to address several unanswered questions: 1) How does resilience influence posttraumatic growth?; 2) How do threat severity, perceived threat, peritraumatic distress, ongoing earthquake-related distress, and prior stressful life events relate to posttraumatic growth?; 3) What are the associations among gender, age, distress, and posttraumatic growth?; 4) How might social adjustment relate to posttraumatic growth; 5) How might education relate to posttraumatic growth in a New Zealand sample; and 6) Which aspects of posttraumatic growth appear to be influenced by culture or the nature of earthquake-related trauma? Study 1 aimed to answer these questions by quantitatively measuring peritraumatic distress, ongoing earthquake-related distress, prior stressful life events, objective threat severity, education, social adjustment, age, and gender, and assessing how these might relate to posttraumatic growth. Study 2 aimed to answer these questions by qualitatively examining descriptions of the earthquake experiences, coping strategies, and posttraumatic growth. Factors were thus noted that participants described as contributing to the development of posttraumatic growth. Study 2 also further explored possible differences in descriptions of posttraumatic growth and distress between genders.

The main models and theories of posttraumatic growth examined in this thesis will now be reviewed, and the contribution of the current studies to these existing models and theories will be examined. The strengths and limitations of the studies in the current thesis will be discussed, along with implications of the studies and areas for future research.

The revised comprehensive model of posttraumatic growth (Calhoun et al., 2010) describes the ruminative processes after a trauma that are influenced by emotional distress and coping mechanisms to produce posttraumatic growth. An individual is influenced by assumptive world beliefs, personal characteristics, and cultural elements prior to experiencing a trauma. In the face of a traumatic event, assumptive worldviews are threatened and distress is experienced. Coping strategies, such as ruminating, seeking to disclose to others, and self-analysis, are used in response to distress. Coping processes and schema changes are influenced by sociocultural forces,

such as broad cultural themes, having access to supports, and modelling of posttraumatic growth by another individual. Coping processes contribute to management of distress, reassessment of goals, and redirecting intrusive rumination to reflective rumination to reshape schemas about the self, others, and the world. Integrating the traumatic event into schemas leads to accepting the world as changed, recognising one's own strength, and posttraumatic growth. As such, one's schemas and narrative of life is fuller and more complex. Wellbeing and satisfaction with life emerge from the revised life narrative and acceptance that one's view of the world has changed. Calhoun et al.'s (2010) model depicts the process of posttraumatic growth and therefore does not conceptualise growth as static. The model implicitly acknowledges that posttraumatic growth changes across time, in line with findings from research. Other elements found to influence posttraumatic growth, such as optimism and gender (Helgeson et al., 2006), are not individually specified in the model, but can fit into the category 'individual differences' pre-trauma. The nature of ongoing distress is also not specified in the model, and neither is it specified whether posttraumatic growth processes differ for individuals struggling psychologically after trauma and those who are coping well.

The organismic valuing theory of growth through adversity (Joseph & Linley, 2005) proposes that an intrinsic drive toward growth encourages individuals to strive to incorporate a trauma into existing worldviews. Whether an individual goes on to develop posttraumatic growth, or posttraumatic stress disorder, or neither, is influenced by the way this new information is processed. Incorporating a trauma into one's previous worldview is difficult and distressing. Cognitive intrusions and avoidance function together to manage distress by maintaining a manageable level of emotion until an equilibrium is reached and a way to comprehend the trauma is found. If the trauma cannot be processed cognitively or emotionally, an individual may develop posttraumatic stress disorder. After comprehending the trauma, the individual can transition to searching for the significance of the trauma for their lives. Incorporating the new trauma into pre-existing worldviews is hypothesised to happen in two ways: assimilation or accommodation. Assimilation involves incorporating trauma-related information into existing worldviews without changing the worldviews, and thus produces a return to baseline functioning. Accommodation involves changing existing worldviews to reflect the new information. Positive accommodation means modifying one's worldviews to produce a positive emotional

response, whereas negative accommodation produces a negative emotional response. For example, after an earthquake an individual's worldview might change from seeing others as generally self-centred to the view that at times of crisis some individuals will act exploitatively for their own gain, whereas others will selflessly help. A negative accommodation might take the stance that, as one cannot predict who is likely to help or harm, it is necessary to protect oneself and be suspicious of others. A positive accommodation involves finding meaning and significance in the trauma experience: some individuals have the potential to be altruistic, therefore it is of benefit to appreciate the potential of humanity and cherish trusted relationships with others. Accommodation is needed for posttraumatic growth to emerge after trauma as one's views of the world and the self change. Positive accommodation leads to posttraumatic growth, whereas negative accommodation can lead to psychopathology. An additional component of this theory is the organismic valuing process, which refers to an instinctive self-knowledge each individual possesses of their personal needs for autonomy, competence, and connection with others, and on how best to meet these needs in order to gain fulfilment and wellbeing. Where individuals are enabled by their social environment to follow their organismic valuing process instinct they can pursue fulfilment; where the search for fulfilment is hindered by the social environment, individuals are less able to follow their own organismic valuing instinct to meet their needs for connection, competence, and autonomy. Prior to a trauma, the organismic valuing process can have been facilitated so that an individual has been able to meet personal needs, and has prior knowledge of how to follow the organismic valuing process to meet such needs. The process influences individuals when rebuilding worldviews, so that new worldviews are true to the self and priorities. This then leads to posttraumatic growth. Posttraumatic growth can lead to wellbeing over time, but may not always lead to increased happiness. However, posttraumatic growth is related to increased wisdom. Research has yet to illustrate how the organismic valuing process works to contribute to posttraumatic growth. It is possible that resilience might influence this model in the way an individual listens to and follows the organismic valuing process instinct.

The 'Janus-face' model of posttraumatic growth (Maercker & Zoellner, 2004) proposes two components of posttraumatic growth: a constructive component that comprises functional change, such as heightened appreciation of life, and an illusory component of growth that functions as a coping strategy. The constructive side of

growth is associated with long-term adjustment, while the illusory side may compensate for short-term emotional distress. An illustration of the coping component could be feeling a vague sense of learning from a trauma without a clear sense of what has been learned, while at the same time experiencing distress; the idea that one is gaining benefits from an experience can soothe the pain of loss and also contribute to denial of distress. This coping component may be harmless if it is accompanied by cognitive processing of the trauma, but if avoidant coping is used the coping component may contribute to longer-term problems. The Janus-face model proposes that these two components of posttraumatic growth co-exist.

Resilience has not been considered as a potential component of the above models or theories of posttraumatic growth. However, where definitions of resilience consider resilient individuals as able to use available resources to maintain adaptive functioning in the face of adversity (Mancini & Bonnano, 2010), it may be surmised that individuals higher in resilience might be less disrupted by trauma, experiencing less distress and therefore having less cause to process a potentially traumatic event to produce posttraumatic growth. In such a way, higher resilience might inhibit posttraumatic growth.

Findings from the current studies indicate that resilience is not directly related to posttraumatic growth and thus does not prohibit posttraumatic growth. Posttraumatic growth is not an aspect of resilience but is, as suggested by Lepore and Revenson (2006), a separate construct. Further, resilience likely influences elements of the posttraumatic growth process to encourage posttraumatic growth. For example, in Study 2, aspects of positive appraisal were found to be exhibited by resilient individuals as evidenced by themes such as appreciating others, counting blessings, considering oneself fortunate, and using humour. Positive appraisal was noted by participants to contribute to posttraumatic growth. Previous research indicates that resilient individuals experience more positive emotions and that these positive emotions balance negative emotions, aiding in recovery after a negative emotional event (Tugade & Fredrickson, 2004). Further, a positive sense of one's own coping abilities, and positive views of the world and of others, influence one's immediate response to a trauma, emotional and physical experiences, one's capacity to make meaning following trauma, and one's subsequent recovery from the trauma (Simmons & Granvold, 2005). As such, existing models of the posttraumatic growth process would be improved by the inclusion of positive appraisal as an influence on the

likelihood of posttraumatic growth, and resilience as an influence on the likelihood of responding to a trauma with positive appraisal. Such positive appraisal could also be conceptualised as a potential contributor to positive accommodation in Joseph and Linley's (2005) organismic valuing theory of growth through adversity

Findings from the current studies illustrate that distress can be experienced by resilient individuals and not lead to psychopathology, but instead can encourage posttraumatic growth, in line with Calhoun et al.'s (2010) comprehensive model and Joseph and Linley's (2005) organismic valuing theory of growth through adversity. While both Calhoun et al.'s (2010) and Joseph and Linley's (2005) models specify that distress is experienced in response to trauma as part of the posttraumatic growth process, different types of distress have not been specified. The current studies show that higher peritraumatic distress, higher severity of the traumatic events, and higher ongoing distress after the event can be included in models of posttraumatic growth processes as influencing greater posttraumatic growth.

Findings from the current studies confirm that greater distress in different forms leads to greater posttraumatic growth. Additionally, distress exists alongside posttraumatic growth, as indicated by participants describing ongoing difficulty while acknowledging areas in which they reported posttraumatic growth. Ongoing distress is acknowledged in the Calhoun et al (2010) comprehensive model of posttraumatic growth as a potential part of the posttraumatic growth process. However, Maercker & Zoellner's (2004) Janus-face model, which proposes that posttraumatic growth can act to soothe distress and support denial of difficulty, does not find support from the current studies' findings. This may in part be because the studies in the current thesis were conducted between two and three years after the largest earthquakes were experienced, and the Janus-face model posits that posttraumatic growth is related to denial earlier in the process of posttraumatic growth, because posttraumatic growth acts as an early comfort for distress. Such posttraumatic growth acknowledged alongside hardship would thus be considered more likely to be the veridical expression of posttraumatic growth within Maercker & Zoellner's Janus-face model (2004).

Distress itself is identified by participants in Study 2 as being related to posttraumatic growth – for example, in the way of appreciating the importance of living each day fully after having had one's life threatened, and appreciating the present and other

people as much as possible. Participants chose to invest their energy in relationships before other endeavours, and spiritual or philosophical pondering occurred more for participants as a result of the widespread distress associated with the earthquakes. Current findings show that initial distress prompts examination of assumptive worldviews, such as realising life could be threatened at any moment, which can be accommodated in a positive framework to produce growth in the form of appreciating each moment in life. Thus, findings support and illustrate the positive accommodation component of Joseph and Linley's (2005) organismic valuing theory of growth through adversity.

The current studies' finding that more highly stressful events prior to the earthquakes contributed to greater posttraumatic growth following the earthquakes supports Joseph and Linley's (2005) organismic valuing theory of growth through adversity, which posits that dealing well with a previous stressful event instils a sense of capability, agency, and competence, which in turn facilitates future coping. Where an individual feels helpless or defeated, stressful life events may be less likely to support coping in future (Connor & Davidson, 2003). Themes in Study 2 indicate that participants often cited stressful past events as helpful for their coping with the earthquake sequence; they knew what kinds of approaches and responses to stressful events were useful for them. Some had gleaned life experience from prior divorces, deaths, illnesses, and other uncontrollable events. Attitudes and coping strategies that emerged from these events may have boosted a sense of competence and self-efficacy, thus contributing to posttraumatic growth.

Findings from Study 1 and Study 2 indicate that, consistent with Fergusson et al.'s (2014) findings, women experienced more distress at the time of the earthquakes. In these studies, women's greater experience of peritraumatic distress and greater experience of distress associated with life events account for women's higher levels of posttraumatic growth after the earthquakes. Women showed a greater tendency to report using self-care and connecting with others when faced with adversity. It is possible that such coping approaches contribute to higher levels of posttraumatic growth. Connecting with others increases the opportunity to improve relationships with others and to report better relationships as a component of posttraumatic growth. Using self-care may be a sign of women responding to personal valuing processes to meet their needs, and this may provide fertile ground from which to process their earthquake experiences and to find positive outcomes in the form of posttraumatic

growth. Existing posttraumatic growth models would benefit from the inclusion of gender as an influence on distress experiences and on coping strategies.

However, social adjustment per se, as measured in Study 1, does not appear to influence the posttraumatic growth process in the current resilient sample; less satisfaction with social relationships was weakly associated with greater posttraumatic growth. These findings are not in line with previous research and it may be that a specific measure of ease with social disclosure might show that ease of disclosure with others and a sense of closeness to others might be more likely to relate to higher posttraumatic growth in this population. Additionally, education showed no influence on the posttraumatic growth process and does not need to be included in models of posttraumatic growth.

Additionally, themes from Study 2 suggest that having a role to play in the response to the earthquakes, whether formal or self-appointed, contributed to posttraumatic growth in a variety of ways: giving a sense of purpose, control, and greater compassion for others. This led to greater connection with others, greater appreciation of others, an increased sense of personal strength, and an increased appreciation of one's own situation. This illustrates the place of role in the development of posttraumatic growth. In the context of organismic valuing theory, Study 2 showed that having a role after the earthquakes provided opportunities for individuals to follow their own valuing processes to meet their needs of competence, autonomy, and relatedness. This is an important example of the organismic valuing process in action in the process of posttraumatic growth, which has not been studied to date. Role was indicated as important for coping and contributing to posttraumatic growth; it is an additional component that existing models would benefit from considering and incorporating. Further, participants described cognitive approaches to their earthquake experiences that allowed them to accept positive and negative circumstances with equanimity. Some participants considered this equanimity to be influenced by proximate (e.g. familial) or distal (e.g. religious) influences. This finding fits nicely with Calhoun et al.'s (2010) comprehensive model of posttraumatic growth, which outlines sociocultural forces as influential in posttraumatic growth processes.

Finally, the current studies showed that aspects of posttraumatic growth outcomes can feed the ongoing process of posttraumatic growth. In particular, it was found that a greater sense of community led to increased social support, which may in turn have



facilitated further posttraumatic growth. Calhoun et al.'s (2010) comprehensive model and Joseph and Linley's (2005) theory do not explicitly consider posttraumatic growth as a continual dynamic process where outcomes influence ongoing contributors to posttraumatic growth. A revised model of posttraumatic growth would benefit from the inclusion of this dynamic aspect.

A good model of the posttraumatic growth process must account for posttraumatic growth in a range of individuals, indicate influences on posttraumatic growth, and be specific where possible. A revised model incorporating findings from the current studies, research to date, and concepts from Calhoun et al.'s (2010) model and Joseph and Linley's (2005) theory is proposed in Figure 7. Arrows indicate one component influencing another. Simple lines indicate links between constructs. Dotted lines indicate possible co-existence of components.

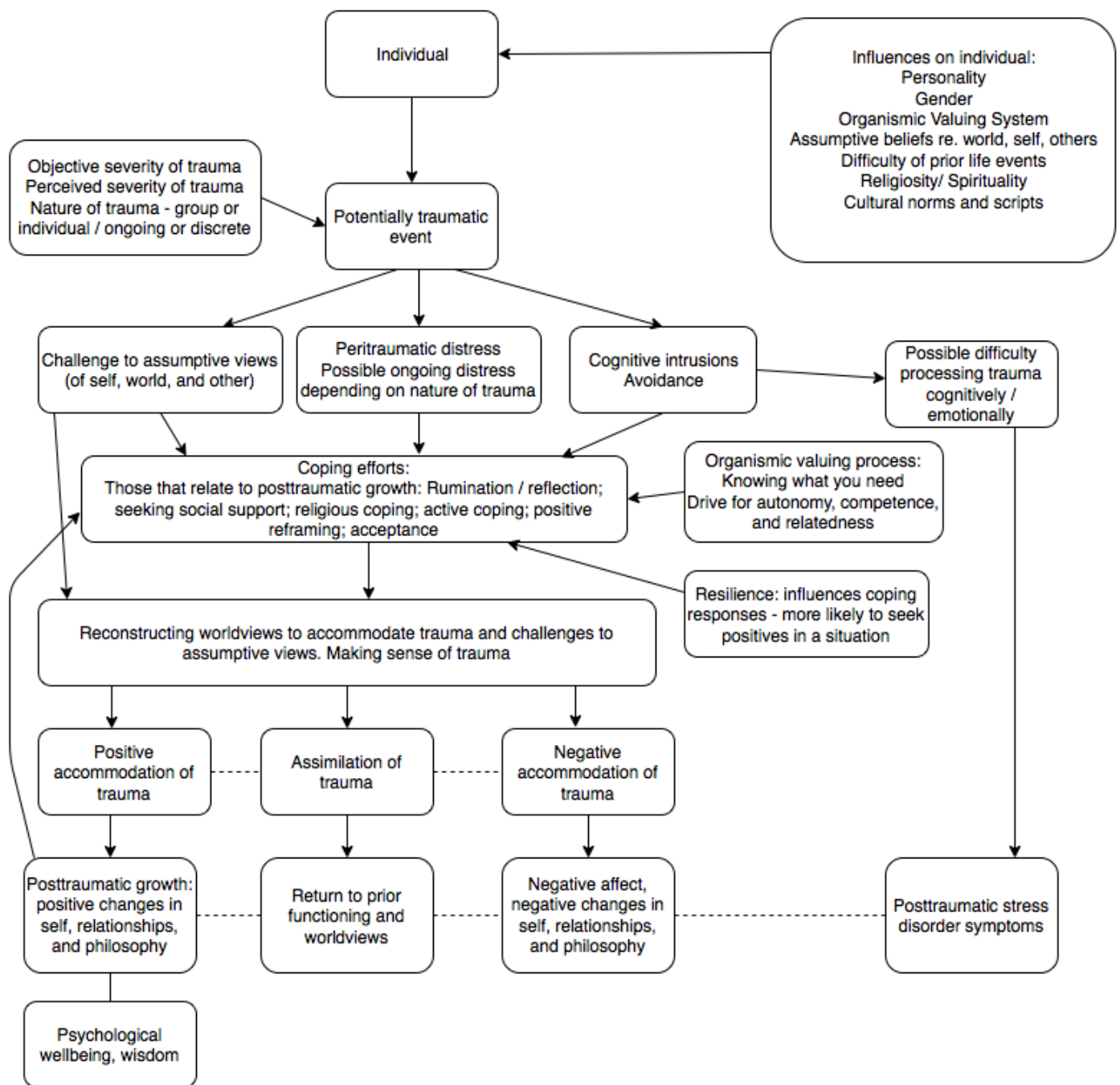


Figure 7: Revised model of posttraumatic growth

## 5.1 Practical implications

Findings from the current study suggest that encouraging affected citizens to have a role to play, by them becoming involved in earthquake recovery, may facilitate coping and encourage posttraumatic growth. Adopting a role can be empowering and can give contact with other individuals, which promotes connection with others, gives a context for one's own hardship, and allows for a sense of solidarity. It is important

that roles reinforce a sense of efficacy and control, so that mastery is likely and efforts support a sense of agency. Providing options for involvement, such as contributing views on city development in Christchurch following the earthquake sequence, gives an opportunity for individuals to contribute to the city, as does helping neighbours or responding to calls for skilled workers to contribute their labour.

Findings from the current studies confirm that, although potentially traumatic experiences such as earthquakes can distress individuals and communities, there is also opportunity for posttraumatic growth. Distress need not be seen as a negative experience in itself, but something that can lead to a richer experience of living. Considering this, it is important that individuals are not expected to exhibit posttraumatic growth, as such an expectation could be interpreted as offensive if an individual is struggling with adjusting to adversity and feels pressure to not only survive but to grow. Such expectations are likely to seem presumptuous and unrealistic to a distressed individual. Rather, where individuals acknowledge positive aspects of their experience this could be encouraged and further explored with a balanced approach to consider the challenging and positive elements of trauma for the individual.

Positive emotions and active responses appear to have had a role in coping with the earthquake sequence, and may be helpful for citizens in the case of another natural disaster. Public health initiatives prompted by the Canterbury earthquake sequence such as the ‘All Right?’ campaign likely played an important role in helping promote positive attitudes after the earthquakes and acceptance of struggles. The campaign aims to encourage residents of Christchurch to improve their wellbeing. This campaign promotes activities that relieve stress and increase wellbeing, such as dancing, walking by the river, spending time with a friend, or giving compliments. Resources to promote wellbeing were visible and widespread in the community, with positive messages on billboards, buses, and in various media. Messages of acceptance that ‘It’s alright to feel a little blue now and then’ and ‘It’s alright to feel overwhelmed some days’ normalised difficulty and promoted self-acceptance. The campaign was seen by two-thirds of Christchurch residents (All Right?, 2014) and likely fostered positive community interactions that supported posttraumatic growth. Findings from the current thesis suggest that campaigns such as ‘All Right?’ are important following large-scale disasters.

Teaching community members about the influence of cognition and behaviour on emotion is likely to help prepare individuals to consider different cognitive responses to difficult events, to become aware of the effect of cognition on emotion, and to consider how helpful their thinking might be. Skills in problem solving and assertiveness teach individuals to take action where appropriate. Social relationships are important for posttraumatic growth; it is of use to society to provide opportunities for social interaction, cultural, and religious activities, where individuals can find others with common interests and have an opportunity to develop relationships. Finally, social skills training is likely to aid individuals who have difficulty connecting with others. Alternatively, implications for disaster recovery are that therapists might work with individuals to identify and acknowledge positive emotions and positive outcomes of disasters alongside negative repercussions, and thus aid survivors to cognitively process their experiences to facilitate the experience of posttraumatic growth. However, posttraumatic growth should not be expected as a necessary outcome of processing trauma, as individuals can recover from trauma successfully without displaying posttraumatic growth, and posttraumatic growth does not necessarily equate to psychological adjustment. Posttraumatic growth can enrich one's life experience, but should not be expected or required from trauma survivors.

## **5.2 Limitations**

The current studies recruited a sample of participants coping well and thus, by definition, is likely to have comprised a truncated sample with respect to posttraumatic growth. Findings from the current study cannot be generalised to Christchurch residents with lower levels of resilience, because of the relatively high level of resilience in the participant sample. Likewise, because of the influence of culture on posttraumatic growth, the current study's results cannot be assumed to reflect posttraumatic growth in participants in different cultural climates than New Zealand. In the current studies, measures of culture, individualism, and collectivism were not made. Further, the current participant sample included one Māori participant, one Cook Island Māori participant, one Indian, and one Chinese participant; the large majority of participants identified as Pākehā or European. This ratio of ethnicities does not reflect the New Zealand population, and therefore is a limitation in generalising findings to other resilient groups in New Zealand. Exploring changes in secular philosophy in addition to religious or spiritual change would also

be useful in the New Zealand context, where individuals are less likely to identify as religious than in many other countries.

The sample for the current study selected themselves by identifying as individuals who were coping well despite their exposure to earthquake-related events. It is possible that such a sample is more likely to have a positive self-concept and that other resilient individuals may have a less positive view of themselves. For example, potential participants may not have volunteered to participate in the current study if they believed that, because they did not experience much distress in response to the earthquakes, they did not experience much hardship. This may have skewed the current study to report more positive perceptions of self in thematic analyses. The current sample included six participants under 30 years old and nine participants between 30 and 39 years. A larger number of younger participants may have allowed possible associations between age and posttraumatic growth to be noted. The current studies may have benefited from a greater number of participants below 40 years old.

Participants were assessed between 2 and 3 years after the initial and largest earthquakes, and memories may have been influenced by recent salient events (positive or negative); participants may have been more likely to report posttraumatic growth if a recent positive experience had been more memorable for them than others, or more likely to report distress if the participant had paid much attention to distressing feelings and memories. If participants had recently had a difficult encounter with EQC or their insurance company, they may have been more likely to report distress related to this (Kazdin, 1998).

Participants were interviewed by one of six interviewers, each of whom may have encouraged different pursuit of topics and had a different influence on interviewees in how much they chose to divulge.

While the exploratory mixed-methods analysis in the current study allowed for the two studies to inform each other, qualitative research is subjective and influenced by the researcher. Therefore, conversion of qualitative to quantitative data does not render the data objective, but lends another perspective in analysis. Finally, the cross-sectional nature of the current study does not allow for causal associations to be noted.

### 5.3 Strengths

The current studies also have substantial strengths. They have enabled a focused examination of posttraumatic growth in a group of individuals coping well after a trauma. Findings contribute to understanding growth in resilient individuals after a major earthquake sequence in a Western country, highlighting that, where individuals are coping well, variations in resilience do not influence levels of posttraumatic growth. These findings are consistent with models of posttraumatic growth (Calhoun et al., 2010; Joseph & Linley, 2005) that do not include resilience as an influence on the posttraumatic growth process.

Associations of posttraumatic growth and different types of distress lend support to models of posttraumatic growth, which outline that ‘emotional distress’ accompanies the process of posttraumatic growth. Associations observed in the current studies have potential to add to existing models of posttraumatic growth. A nuanced examination was undertaken of the association between different types of distress and posttraumatic growth. The specific measures of distress used in the current study describe the exact nature of recalled distress that is associated with posttraumatic growth, instead of a more vague measure asking participants to recall ‘distress’, which may be interpreted differently by different participants. Further, the interplay between distress, gender, and posttraumatic growth was able to be explored.

The current studies are the first to measure posttraumatic growth in a group of individuals uniformly coping well after trauma. The current sample allowed variations in resilience to be measured in those coping well and resilience to be examined in relation to posttraumatic growth. Findings are able to provide instances of posttraumatic growth in individuals with higher levels of resilience, in opposition to theories that suggest resilience precludes posttraumatic growth. Concentrating on a resilient sample without psychiatric diagnoses has allowed examination of posttraumatic growth in the absence of posttraumatic stress disorder. This is important because a large number of existing studies have focused on associations between posttraumatic stress disorder and posttraumatic growth, yet the overemphasis in existing studies on posttraumatic stress disorder symptoms may mask other possible associations between different types of distress and posttraumatic growth in individuals coping well.

The large number of participants interviewed for this study allowed for both quantitative and qualitative analysis. The large sample size also enabled an exploratory analysis of data using mixed-methods to transform qualitative information into quantitative data and test for possible gender differences. This is not a common approach in qualitative research, as most qualitative studies use a much smaller data set that is not suitable for quantitative analysis using a mixed-method approach. However, there are some guidelines that suggest feasible methods to combine qualitative and quantitative methods to enrich the understanding of the data (Driscoll et al., 2007). Qualitative analysis provides a richness of description to data indicating that aspects of posttraumatic growth were present in this population. Participants described the nature of their perceived growth, responses to their own growth, and philosophical approaches to life. The analysis brought life to the statistics; where participants endorsed increased Appreciation of Life on the Posttraumatic Growth Inventory in Study 1, in Study 2 it was possible to note that participants experienced gratitude, a greater appreciation for the present and for others, and a more enriched experience in living day-to-day.

The current studies examined different aspects of distress to delineate which types of distress relate to posttraumatic growth for resilient individuals. These different types of distress are able to be used to bring greater specificity to existing models of posttraumatic growth. Associations among gender, types of distress, and posttraumatic growth were explored in this sample of individuals coping well. Findings illustrate how mechanisms of posttraumatic growth such as the organismic valuing process can work to produce posttraumatic growth.

The current studies suggest additional considerations for models of posttraumatic growth, such as expressions of posttraumatic growth influencing the ongoing process of posttraumatic growth. The theme of a 'Greater sense of community' was noted to be perceived as an aspect of posttraumatic growth by participants, indicating that in future, research would benefit from considering communal experiences as relevant to the posttraumatic growth of the individual.

The shared experience of the earthquakes also allowed for comparison between individuals and genders in response to the same events. This contrasts with other studies that have measured posttraumatic growth in response to experiences such as illness or accidents that necessarily differ in severity and timing, and may therefore be

confounded by such differences. The large-scale adverse effects of the earthquakes on many individuals also allowed for a specific focus on resilient individuals; it is more difficult to focus on such a group with traumas that affect fewer individuals.

Study 1 is the first to measure posttraumatic growth in a New Zealand context using the Posttraumatic Growth Inventory, a widely-used international measure of posttraumatic growth. Additionally, specific measurement of peritraumatic distress, distress associated with traumatic exposure severity, and difficulty related to stressful life events allowed for demarcation between different types of distress and posttraumatic growth in a resilient sample.

#### **5.4 Future research**

The current studies suggest several ways in which genders may respond differently to trauma and exhibit different levels of posttraumatic growth. In the current studies, the tentative conclusions that women might use a broader range of coping strategies in the face of adversity and might be more likely to cope using social support and self-care warrant further research. Additionally, future studies might examine why women may experience more peritraumatic distress and how this might influence posttraumatic growth. It is possible that women are more likely to experience intense affect and to reflect on this, and that this might lead to higher posttraumatic growth. These hypotheses warrant further examination. Themes of burden in Study 2 were not reported by women more than men; however, in a larger representative sample, themes of intense emotion may be more able to be examined according to gender.

In regards to social adjustment measures, it would be of interest to examine a wider range of social adjustment and how this might relate to posttraumatic growth. It is possible that impaired emotional and instrumental performance in one's role mean lower levels of posttraumatic growth; such a possibility warrants further exploration.

Findings showed that some participants described earthquake events as an adventure and as exciting. Personality factors such as extraversion have been explored in previous research and have been found to relate positively to posttraumatic growth. It would thus be of interest to examine whether individuals who tend to view events such as earthquakes in a positive way are higher in personality factors such as novelty seeking, and whether this might relate to posttraumatic growth.



Participants described an awareness of helpful ways to cognitively approach their experiences, as illustrated in themes of not worrying about events outside one's control, accepting situations as they are, and choosing to take a positive outlook on events. Such descriptions point to a role for metacognition – thinking about the process of thinking – in the posttraumatic growth process for this sample. Metacognitions have not been explored in relation to posttraumatic growth but may influence preferred coping strategies; this is an area for future research.

Longitudinal research could allow for monitoring of posttraumatic growth and its correlates over time and could further elucidate the association between distress, optimism, social support, gender, resilience, and posttraumatic growth. Longitudinal analysis would assist in examining whether posttraumatic growth is related to early peritraumatic distress at different stages after a trauma, or whether posttraumatic growth relates more to ongoing distress after a trauma. Such analysis would have the advantage of measuring posttraumatic growth at different points in time rather than relying on an individual's recall of posttraumatic growth at certain times after a trauma.

Investigations into cultural influences on posttraumatic growth are needed, including the constructs of individualism and collectivism and the cultural scripts that influence coping responses. As culture is identified as an influence on the posttraumatic growth process by Calhoun et al (2010), it is important to investigate by what mechanisms cultural influence can be seen.

Finally, it would be of interest to compare posttraumatic growth in a sample with posttraumatic stress disorder in response to earthquakes, to examine differences in posttraumatic growth after the same community-wide event. Themes of earthquake narratives could be compared to ascertain which themes are common to resilient individuals and those with posttraumatic stress disorder. In this way, findings of posttraumatic growth could be conclusively related to levels of resilience or difficulty.

## **5.5 Conclusion**

The current studies' findings are important because they indicate that resilient individuals experience posttraumatic growth at the same time as describing earthquake-related distress. Higher levels of resilience do not hamper the posttraumatic growth process. Posttraumatic growth was expressed in similar ways by

resilient individuals as has been found in studies of individuals with varied levels of psychopathology.

The association of gender, distress in different forms, and posttraumatic growth was explored. Higher levels of posttraumatic growth related to higher reported levels of peritraumatic distress, higher distress during and since the earthquakes, more difficulty with life events, and higher objective exposure to earthquake-related events. There was no point at which higher levels of distress related to decreasing levels of posttraumatic growth, suggesting that in this population the levels of distress were not at any stage detrimental to the process of posttraumatic growth. Women reported higher levels of posttraumatic growth than men, and also higher levels of peritraumatic distress, more difficulty with life events, and higher distress associated with earthquake-related events during and since the earthquakes (such as ongoing difficulties with housing, EQC, and insurance). Women's higher levels of distress accounted for their higher levels of reported posttraumatic growth. The processes behind women reporting more distress and the ways in which this leads to greater posttraumatic growth remain to be seen.

Importantly, descriptions of posttraumatic growth in response to earthquake experiences indicated that the posttraumatic growth process is not simple, with constructs likely influencing one another directly and indirectly to produce posttraumatic growth. Expressions of posttraumatic growth, such as a greater sense of community, likely influence the posttraumatic growth process further and in a circular manner. The expression of posttraumatic growth may be influenced by factors such as the trauma being communal, producing stronger relationships with others through shared understanding of hardship.

As Cantabrians emerge from the aftermath of the earthquake sequence, some lessons can be taken from the current findings. In the face of future adversity, it is important to provide opportunities for citizens to take on roles in the response and recovery process. Individuals can be assisted to build their own resources to support posttraumatic growth by enabling them to make social connections in the community. There is also a role for education on the role of cognition and behaviour when processing experiences: not denying hardship and making space for acknowledging positive outcomes where they might be perceived. A disaster can be considered an

event that not only can incur damage, but also can trigger a process of discovering hidden gems in oneself, in others, and in living life.

‘Where there is ruin, there is hope for a treasure’ – Rumi

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## **Appendix A: Advertisement and recruitment article in local newspaper**

Understanding response to earthquakes: promoting recovery and building resilience

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We are seeking volunteers for a study on the effects of the Canterbury earthquakes.

We are interested in including in our study people who are coping reasonably well in spite of having had loss or hardship as a result of the earthquakes (such as loss or difficulties at work or home, death or injury of family or friend), or who witnessed the effects of the earthquakes, such as being in the city centre and seeing fallen buildings or injured people. The study will involve assessment of psychological responses, verbal memory and emotional processing, and measurement of stress hormones and heart rate variability.

If you are interested in being involved in this study or would like further information, please contact Alex Loughlin at the Department of Psychological Medicine, University of Otago, Christchurch on 372 0400 or email [alex.loughlin@canterbury.ac.nz](mailto:alex.loughlin@canterbury.ac.nz).





## 'Good copers' needed for study

NICOLE MATHEWSON    Last updated 05:00 17/11/2012

Christchurch researchers are seeking volunteers to help them understand more about how people cope with difficult experiences, such as the Canterbury earthquakes.

In a joint project between the University of Otago, Christchurch, and the University of Canterbury researchers would look at how those who had experienced loss or hardship in the quakes managed to cope.

Clinical psychologist Virginia McIntosh said the researchers aimed to assess about 100 volunteers aged between 18 and 65 over summer.

Participants needed to be people who felt they were coping well, despite witnessing the effects of the quakes, such as being in the central city when the February 2011 quake hit, or facing difficulties related to the disaster, such as losing their home or job, or experiencing the loss or injury of family or friends.

McIntosh, who was part of the Canterbury District Health Board's quake treatment team, which worked with those struggling to cope with the quakes, said there were many people who "do very well" during stressful situations.

"We want to understand what things are useful as coping strategies . . . building psychological resilience."

To take part in the project, call Alex Loughlin on 372 0400 or email [alex.loughlin@canterbury.ac.nz](mailto:alex.loughlin@canterbury.ac.nz).



The Press - [www.press...](http://www.press.co.nz)

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## Appendix B: Flyer distributed in community centres



# Understanding response to earthquakes: promoting recovery and building resilience



## We are seeking volunteers for a study on the effects of the Canterbury earthquakes.

We are interested in including in our study people who have had loss or hardship as a result of the earthquakes (such as loss or difficulties at work or home, death or injury of family or friend), or who witnessed the effects of the earthquakes, such as being in the city centre and seeing fallen buildings or injured people, yet have felt able to cope with these events and effects. The study will involve assessment of psychological responses, verbal memory and emotional processing, and measurement of stress hormones and heart rate variability.

We are interested in how these and other factors such as past mental health and severity of exposure to the earthquakes or difficulties as a result of the earthquakes may relate to the severity of psychological responses after a major event such as the earthquakes.

In addition we will also be studying a group of people who require treatment for very significant earthquake-related distress.

If you are interested in being involved in this study or would like further information, please contact Alex Loughlin at the Department of Psychological Medicine, University of Otago, Christchurch on 372 0400 or email [alex.loughlin@canterbury.ac.nz](mailto:alex.loughlin@canterbury.ac.nz)

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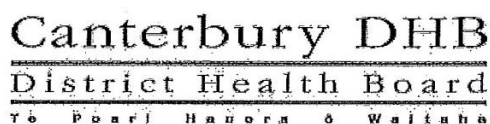
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## Appendix C: Information form for the larger community study and the current studies



The Christchurch School of Medicine & Health Sciences

DEPARTMENT OF PSYCHOLOGICAL MEDICINE

Telephone (03) 372 0400

Fax (03) 372 0407

### **Understanding response to earthquakes: promoting recovery and building resilience**

#### **Information Sheet – Non Treatment Group**

*University of Otago – Department of Psychological Medicine*

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#### **Introduction**

You are being invited to take part in a research study about psychological responses to the Canterbury earthquakes because you were in Canterbury during one or more of the major earthquakes and have been exposed to some earthquake-related events or changes. It is important for you to understand why the research is being conducted and what it will involve. Please take time to read over this information sheet carefully and to ask us if there is anything that is not clear or if you would like more information. You are free to discuss this study with others to help you come to a decision.

#### **What is the purpose of the study?**

You will be one of a number (around 100) of people volunteering for this study of responses to the Canterbury earthquakes. In addition we will be studying 100 people who require treatment for very significant earthquake-related distress. Your psychological responses to the earthquakes will be assessed along with measures of verbal memory and emotional processing, and levels of stress hormones. We are interested in how these and other factors such as past mental health problems and severity of exposure to the earthquakes or problems as a result of the earthquakes may relate to the severity of psychological difficulties after a major event such as the earthquakes.

#### **Who is running the study?**

This study is being conducted by Drs Caroline Bell, Virginia McIntosh, Janet Carter, Martin Dorahy, Jenny Jordan, Frances Carter, Helen Colhoun and Richard Porter, and Mrs Dianne LeCompte. These researchers are working at the University of Otago, Christchurch and Canterbury University.

#### **Do I have to take part?**

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are free to withdraw at any time without giving a reason. In the event that you withdraw from the study all data collected from you will be destroyed and will not be included in the study.

#### **What will happen to me if I take part?**

First you will have a structured clinical interview about your psychological and mental health history and responses to the earthquakes. If you have a serious psychological problem we may ask your permission to contact your GP or refer you for treatment. If you agree to this research then you will also complete questionnaires asking about demographics (gender, age, ethnicity, education, occupation, relationship status, and the suburb you live in); severity of earthquake-related trauma exposure (such as the loss of a friend or family member, damage to home or employment); PTSD scale (the PTSD Checklist (PCL); Work and Social Adjustment Scale; and a scale to assess alcohol use, the AUDIT.

To measure stress hormone levels, we will ask you to collect samples of your saliva (by chewing a piece of cotton wool and putting it into containers which we will supply), seven times a day over two days. We will ask you to do this before and after treatment.

To measure your heart rate variability you will be fitted with electrodes and will remain seated in a quiet room watching a nature film for 15 minutes. Physiological measurements will be obtained using the BIOPAC MP150 (Biopac Systems Inc., Goleta, California). Electrodes will be placed on both lower arms (to measure heart rate) and the index and third finger of the right hand (to measure skin conductance). You will be asked to move as little as possible. Before and after the procedure, you will be asked to rate how you are feeling.

In an unstructured interview, you will be asked to describe your earthquake-related experiences, including any changes that have happened for you since the earthquakes began, how you have coped with these changes, and whether any personal growth has occurred due to these events. This interview will be recorded and will then be transcribed (with any identifying information removed). Your descriptions will be analysed along with those of others in the study for several different purposes related to specific ways people view their experiences and how these change over time. No information that could identify any individual will be included in any reports from the study.

You will also complete a short (approximately 30 minutes) series of computer tasks to assess how you identify certain emotions in facial expressions.

#### **What are the risks involved in taking part in the study?**

We do not anticipate any physical or psychological risks involved with this study. If you were to become distressed while participating in the study, or over this time your mood was very low or you were feeling desperate or suicidal, it is important that you stop, and make contact with your family or support person, GP, the researcher or Psychiatric Emergency Service.

#### **Will I receive compensation for time taken to be part of this study?**

There will not be any compensation for the extra time spent on the study. However, we will pay for parking and other expenses that may be involved in these visits

#### **Will my taking part in this study be kept confidential?**

We will hold information about you on a computer in the Department of Psychological Medicine in Christchurch. Only those directly involved in the study will have access to this information and we will ensure that confidentiality is kept.

(If in the course of the research we discover information which is important to your continued health and safety, we will discuss this with you and ask your permission to convey this to your General Practitioner.)

**What will happen to the results of the research?**

We plan to finish the study by the end of 2013. After the study is completed we will be happy to let you know and to discuss the results of the study with you. We plan to submit the results for publication in a science journal. You can be assured of the complete confidentiality of the data gathered in this investigation; the identity of the participants will not be made public. You are welcome to request a copy of our published results when these are available.

**Where can I get information about the study?**

Drs Caroline Bell and Virginia McIntosh can be contacted by telephone on (03) 3720400 ext. 86430 or e mail on [caroline.bell@otago.ac.nz](mailto:caroline.bell@otago.ac.nz) or [virginia.mcintosh@otago.ac.nz](mailto:virginia.mcintosh@otago.ac.nz).

If you have any questions or concerns about your rights as a participant in this research study you can contact an independent health and disability advocate. This is a free service provided under the Health and Disability Commissioner Act.

Telephone: (NZ wide): 0800 555 050

Free Fax (NZ wide): 0800 2787 7678 (0800 2 SUPPORT)

Email (NZ wide): [advocacy@hdc.org.nz](mailto:advocacy@hdc.org.nz)

Please keep this information sheet. Thank you for considering this proposal.

**This project has been approved by the Upper South A Regional Ethics Committee**

## Appendix D: Consent form for the larger community study and the current studies



The Christchurch School of Medicine & Health Sciences  
DEPARTMENT OF PSYCHOLOGICAL MEDICINE

Telephone (03) 372 0400

Fax (03) 372 0407

### Understanding response to earthquakes: promoting recovery and building resilience

#### Consent Form

*University of Otago – Department of Psychological Medicine*

I have been invited to take part in a study investigating responses to the Canterbury earthquakes. This research is being conducted by Drs Caroline Bell, Virginia McIntosh, Jenny Jordan, Janet Carter, Martin Dorahy, Frances Carter, Helen Colhoun and Richard Porter and Mrs Dianne LeCompte.

- I have read and I understand the information sheet dated 31.05.12 and description of the above-named project. I agree to participate in the project, and I consent to publication of the results of the project with the understanding that confidentiality will be preserved.
- I have had the opportunity to discuss the project with others in order to come to a decision.
- I also understand that participation is voluntary (my choice), and I may withdraw from the project at any time. In the event that I withdraw from this study all data collected from me will be destroyed and will not be included in the study.
- I understand that part of my interview will be audio-recorded, and the recording will be transcribed for research purposes.

PARTICIPANT'S NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

Signature: \_\_\_\_\_

INVESTIGATOR'S NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

Signature: \_\_\_\_\_

## Appendix E: Measures used in Study1

### General Information

<b>1. Gender</b> <input type="checkbox"/> Male <input type="checkbox"/> Female	<b>6. Ethnicity</b> <input type="checkbox"/> New Zealand European <input type="checkbox"/> Māori <input type="checkbox"/> Samoan <input type="checkbox"/> Cook Island Māori <input type="checkbox"/> Tongan <input type="checkbox"/> Nieuwean <input type="checkbox"/> Chinese <input type="checkbox"/> Indian <input type="checkbox"/> Other. Please specify_____
<b>2. Date of Birth</b> --/--/----	
<b>3. Occupation</b> How would you describe your <b>main</b> work or activity? <input type="checkbox"/> Full or part-time student <input type="checkbox"/> Full or part-time wage/salary earner <input type="checkbox"/> Unemployed <input type="checkbox"/> Home responsibilities <input type="checkbox"/> Retired or not working by choice <input type="checkbox"/> Sickness or invalid benefit	
<b>4. Education</b> What is the highest level of education you have achieved? <input type="checkbox"/> Primary <input type="checkbox"/> 1-4 years High School <input type="checkbox"/> 5-6 years High School <input type="checkbox"/> Trade or Technical Certificate <input type="checkbox"/> Bachelor Degree/Diploma <input type="checkbox"/> Post Graduate Degree	
<b>5. Current Relational Status</b> <input type="checkbox"/> Single <input type="checkbox"/> Married/Committed Partnership <input type="checkbox"/> Divorced/Separated <input type="checkbox"/> Widowed <input type="checkbox"/> Other. Specify_____	

## Social Adjustment Scale (SAS)

**WORK OUTSIDE THE HOME:** The following questions are about how things have been in your job (full-time or part-time). If you do not have a job go straight on to the next section.

Over the past two weeks have you:					
1. missed any time from work?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME
2. been doing your job well?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONAL LY	NOT AT ALL
3. felt ashamed of how you have been doing your work?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTL Y
4. got angry with or argued with people at work?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTL Y
5. felt upset, worried or uncomfortable at work?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTL Y
6. been finding your work interesting?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONAL LY	NOT AT ALL

**HOUSEHOLD TASKS:** The following questions are about how you have been doing your household tasks.

Over the past two weeks have you:					
7. done the necessary household tasks each day?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONAL LY	NOT AT ALL
8. been doing the household tasks well?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONAL LY	NOT AT ALL
9. felt ashamed of how you have been doing the household tasks?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTL Y
10. got angry with or argued with salespeople, tradesmen or neighbours?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTL Y
11. felt upset, worried or uncomfortable while doing the household tasks?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTL Y
12. found the household tasks boring, unpleasant or a drudge?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTL Y

**SOCIAL AND LEISURE ACTIVITIES:** The following questions are about your friends and what you have been doing in your spare time.

Over the past two weeks have you:					
13. been in touch with any of your friends?	VERY OFTEN	OFTEN	A FEW TIMES	VERY RARELY	NOT AT ALL
14. been able to talk about your feelings openly with your friends?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONAL LY	NOT AT ALL



15. done things socially with your friends (eg. Visiting, entertaining, going out together)?	VERY OFTEN	OFTEN	A FEW TIMES	VERY RARELY	NOT AT ALL
16. spent your available time on hobbies or spare time interests?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONALLY	NOT AT ALL
17. got angry with or argued with your friends?	NOT AT ALL	OCCASIONALLY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTLY
18. been offended or had your feelings hurt by your friends?	NOT AT ALL	OCCASIONALLY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTLY
19. felt ill at ease, tense or shy when with people?	NOT AT ALL	OCCASIONALLY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTLY
20. felt lonely and wished for companionship?	NOT AT ALL	OCCASIONALLY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTLY
21. felt bored in your free time?	NOT AT ALL	OCCASIONALLY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTLY

**EXTENDED FAMILY:** The following questions are about your extended family, ie, your parents, brothers, sisters, in-laws, and children not living at home.

Over the past two weeks have you:					
22. got angry with or argued with any of your relatives?	NOT AT ALL	OCCASIONALLY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME
23. made an effort to keep in touch with your relatives?	VERY OFTEN	OFTEN	A FEW TIMES	VERY RARELY	NOT AT ALL
24. been able to talk about your feelings openly with your relatives?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONALLY	NOT AT ALL
25. depended on your relatives for help, advice or friendship?	NOT AT ALL	OCCASIONALLY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME
26. worried more than necessary about things happening to your relatives?	NOT AT ALL	OCCASIONALLY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME
27. been feeling that you have let your relatives down at any time?	NOT AT ALL	OCCASIONALLY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME
28. been feeling that your relatives have let you down at any time?	NOT AT ALL	OCCASIONALLY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME

**PARTNER:** The following questions are about how things have been between you and your partner. If you are NOT living with your partner or living with a person in a steady relationship, go straight on to the next section.

Over the past two weeks have you:					
29. got angry with each other or argued with one another?	NOT AT ALL	OCCASIONALLY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME
30. been able to talk about your feelings and problems with your partner?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONALLY	NOT AT ALL
31. been making most of the decisions at home yourself?	NOT AT ALL	OCCASIONALLY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME

		LY			
32. tended to give in to your partner and let them have their own way when there was a disagreement?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME
33. and your partner shared the responsibility for practical matters that have arisen?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONAL LY	NOT AT ALL
34. had to depend on your partner to help you?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME
35. been feeling affectionate towards your partner?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONAL LY	NOT AT ALL
36. and your partner had sexual relations? About how many times?	FOUR OR FIVE TIMES	THREE TIMES	TWICE	ONCE	NOT AT ALL
37. had any problems during sexual intercourse (eg. pain or difficulty reaching climax)?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	EVERY TIME
38. enjoyed your sexual relations with your partner?	EVERY TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONAL LY	NOT AT ALL

**CHILDREN:** The following questions are about how things have been between with your children. If you do not have any children living at home, go straight on to the next section.

Over the past two weeks have you:					
39. been interested in your children's activities, eg. school, friends, etc?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONAL LY	NOT AT ALL
40. been able to talk to and listen to your children?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONAL LY	NOT AT ALL
41. been shouting at or arguing with your children?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	CONSTANTLY
42. been feeling affectionate towards your children?	ALL THE TIME	MOST OF THE TIME	ABOUT HALF THE TIME	OCCASIONAL LY	NOT AT ALL

**FAMILY UNIT:** The following questions are about how things have been between with your immediate family, that is your partner and children at home. If you do not have immediate family living with you, please ignore this section.

Over the past two weeks have you:					
43. been worrying more than necessary about things happening to your family?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME
44. been feeling that you have let your immediate family down at any time?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME
45. been feeling that your immediate family has let you down at any time?	NOT AT ALL	OCCASIONAL LY	ABOUT HALF THE TIME	MOST OF THE TIME	ALL THE TIME

Thank you for completing this section of the questionnaire.

The following section asks questions about your experience of the Canterbury earthquakes. Some people may find it difficult or upsetting thinking about these experiences. If you would like to discuss the next questions with a member of the therapy team before finishing the questionnaire, you are very welcome to do this. Or if you would like a cuppa while you complete the next section, or would like to move into one of the interview rooms where you can be more private, please let the receptionist know.

Please let the receptionist know when you are ready to move on to the interview or to see the therapist to discuss the next questions.

## Traumatic Exposure Severity Scale (TESS)

	YES	NO	If YES, indicate how distressing this was for you				
			NOT AT ALL DISTRESSING				EXTR EMELY DISTRESSING
1. Were you alone at the time of the earthquake?	YES	NO	1	2	3	4	5
2. Were members of your family apart at the time of the earthquake?	YES	NO	1	2	3	4	5
3. Did you have children you were responsible for under the age of fourteen?	YES	NO	1	2	3	4	5
4. Did you have to spend the night somewhere other than in your home?	YES	NO	1	2	3	4	5
5. Did you need food and water aid after the earthquake?	YES	NO	1	2	3	4	5
6. Did you need clothes aid after the earthquake?	YES	NO	1	2	3	4	5
7. Did you need shelter after the earthquake?	YES	NO	1	2	3	4	5
8. Did you suffer financial difficulties because of the earthquake?	YES	NO	1	2	3	4	5
9. Did you need financial assistance from others because of hardships caused by the earthquake?	YES	NO	1	2	3	4	5
10. Was your home damaged in the earthquake?	YES	NO	1	2	3	4	5
11. Have there been times when you have not had essential services (eg, power, water, sewerage) where you were living due to the earthquake?	YES	NO	1	2	3	4	5
12. Did you have to relocate because your house became structurally unsafe to live in?	YES	NO	1	2	3	4	5
13. Have you had frustrations dealing with insurance or EQC matters?	YES	NO	1	2	3	4	5
14. Have you had problems as a result of the zoning of your home (whether your home is in an area zoned green/orange/red/white)?	YES	NO	1	2	3	4	5
15. Have you had others living with you in your home since the earthquake?	YES	NO	1	2	3	4	5
16. Has your employment been affected since the earthquake?	YES	NO	1	2	3	4	5
17. Have you lost your job since the earthquake?	YES	NO	1	2	3	4	5
18. Has your work premises been disrupted (eg, needed to relocate, needed to share workspace) since the earthquake?	YES	NO	1	2	3	4	5
19. Have your children attended school in a different place due to their usual school being damaged in the earthquakes?	YES	NO	1	2	3	4	5
20. Have your children attended school at a different time due to their school sharing premises with another school due to earthquake damage?	YES	NO	1	2	3	4	5
21. Did you lose movable goods in the earthquake?	YES	NO	1	2	3	4	5
22. Were you physically injured in the earthquake?	YES	NO	1	2	3	4	5
23. Did you lose an organ or functioning of an organ in the earthquake?	YES	NO	1	2	3	4	5
24. Did you become dependent on others because of the physical injuries/losses you suffered?	YES	NO	1	2	3	4	5
25. Were you buried under rubble for a period of time after the earthquake?	YES	NO	1	2	3	4	5
26. Were you trapped in a building for a period of time after the earthquake?	YES	NO	1	2	3	4	5
27. Did you lose any members of your immediate family in the earthquake?	YES	NO	1	2	3	4	5
28. Were any members of your family or your loved ones physically injured in the earthquake?	YES	NO	1	2	3	4	5
29. Did any of your loved ones become dependent on you for physical care because of their injuries?	YES	NO	1	2	3	4	5
30. Was a member of your family or someone close to you trapped under rubble or in a building?	YES	NO	1	2	3	4	5

31. Was there a period when you knew your loved ones were buried under rubble or in a building but you were unable to reach them?	YES	NO	1	2	3	4	5
32. Was there a period when you were uncertain about the welfare of loved ones, when you were unable to establish contact or unable to locate them?	YES	NO	1	2	3	4	5
33. Did you lose any relatives (e.g., aunts, uncles, cousins, grandparents) in the earthquake?	YES	NO	1	2	3	4	5
34. Have any close family been distressed at having to move from their homes?	YES	NO	1	2	3	4	5
35. Did you see buildings falling down as a result of the earthquake?	YES	NO	1	2	3	4	5
36. Did you see injured people after the earthquake?	YES	NO	1	2	3	4	5
37. Were you involved in rescue work?	YES	NO	1	2	3	4	5
38. Did you see dead bodies or body parts during the rescue and clearing up work period?	YES	NO	1	2	3	4	5
39. Did you hear sounds and cries for help from individuals trapped under rubble?	YES	NO	1	2	3	4	5

### Life Events Scale

Please read each statement and indicate whether the following events have applied to you IN THE LAST FIVE YEARS. Indicate by circling Yes or No. Then indicate how difficult this event has been for you on a 1 – 5 scale, where 1=not at all difficult and 5=extremely difficult. Finally, indicate whether the event has applied during the past six months. There are no right or wrong answers. Do not spend too much time on any statement.

1. Did your income increase by a lot?	YES	NO	1	2	3	4	5	YES	NO
2. Did you go deeply in debt?	YES	NO	1	2	3	4	5	YES	NO
3. Did your income decrease by a lot?	YES	NO	1	2	3	4	5	YES	NO
4. Did you go without food because you didn't have the money to pay for it?	YES	NO	1	2	3	4	5	YES	NO
5. Did you go without some clothing because you couldn't pay for it?	YES	NO	1	2	3	4	5	YES	NO
6. Did you miss a rent or mortgage payment because you couldn't pay for it?	YES	NO	1	2	3	4	5	YES	NO
7. Did the utility or phone company threaten to cut off your service because you couldn't pay the bills?	YES	NO	1	2	3	4	5	YES	NO
8. Was your telephone, electricity or gas turned off?	YES	NO	1	2	3	4	5	YES	NO
9. Did you go without furniture because you did not have the money to pay for it?	YES	NO	1	2	3	4	5	YES	NO
10. Did you go without appliances because you did not have the money to pay for them?	YES	NO	1	2	3	4	5	YES	NO
11. Did you lose your housing?	YES	NO	1	2	3	4	5	YES	NO
12. Did you miss an appointment or have to change your plans because you had no transportation to get there?	YES	NO	1	2	3	4	5	YES	NO
13. Did you have legal problems?	YES	NO	1	2	3	4	5	YES	NO
14. Did anyone in your family get arrested?	YES	NO	1	2	3	4	5	YES	NO
15. Did anyone in your family go to jail?	YES	NO	1	2	3	4	5	YES	NO
16. Did your children get into trouble?	YES	NO	1	2	3	4	5	YES	NO
17. Did you have trouble reading or understanding something that was important to you?	YES	NO	1	2	3	4	5	YES	NO
18. Did you return to school?	YES	NO	1	2	3	4	5	YES	NO
19. Did you have trouble with your teacher(s)?	YES	NO	1	2	3	4	5	YES	NO
20. Did your regular child care arrangements change in any way?	YES	NO	1	2	3	4	5	YES	NO

21. Did you get married?	YES	NO	1	2	3	4	5	YES	NO
22. Did you get a divorce or break up with a partner?	YES	NO	1	2	3	4	5	YES	NO
23. Did you get back together with a partner?	YES	NO	1	2	3	4	5	YES	NO
24. Did a family member die?	YES	NO	1	2	3	4	5	YES	NO
25. Did a friend die?	YES	NO	1	2	3	4	5	YES	NO
26. Did anything happen in your neighborhood that made you feel unsafe?	YES	NO	1	2	3	4	5	YES	NO
27. Did you feel emotionally or physically abused?	YES	NO	1	2	3	4	5	YES	NO
28. Did your child(ren) feel emotionally or physically abused?	YES	NO	1	2	3	4	5	YES	NO
29. Were you a victim of a crime while you were in your own home?	YES	NO	1	2	3	4	5	YES	NO
30. Were you a victim of a crime while you were outside or away from your home?	YES	NO	1	2	3	4	5	YES	NO
31. Did you hear violence outside your home? (e.g. gunfire)	YES	NO	1	2	3	4	5	YES	NO
32. Did you see violence?	YES	NO	1	2	3	4	5	YES	NO
33. Did your child(ren) see violence?	YES	NO	1	2	3	4	5	YES	NO
34. Was your child a victim of a crime?	YES	NO	1	2	3	4	5	YES	NO
35. Was anyone else in your household a victim of a crime?	YES	NO	1	2	3	4	5	YES	NO
36. Did you see drug dealing in your building or neighborhood?	YES	NO	1	2	3	4	5	YES	NO
37. Did you(r partner) get pregnant?	YES	NO	1	2	3	4	5	YES	NO
38. Did you(r partner) have a baby?	YES	NO	1	2	3	4	5	YES	NO
39. Did you(r partner) have a miscarriage?	YES	NO	1	2	3	4	5	YES	NO
40. Did you(r partner) have an abortion?	YES	NO	1	2	3	4	5	YES	NO
41. Did you ever use alcohol or drugs to get through a day?	YES	NO	1	2	3	4	5	YES	NO
42. Did you become ill or did you have a flare up of a chronic illness?	YES	NO	1	2	3	4	5	YES	NO
43. Did your child(ren) become ill or did your child(ren) have a flare up of a chronic illness?	YES	NO	1	2	3	4	5	YES	NO
44. Did you get admitted to the hospital?	YES	NO	1	2	3	4	5	YES	NO
45. Did your child(ren) get admitted to the hospital?	YES	NO	1	2	3	4	5	YES	NO
46. Did another family member become ill?	YES	NO	1	2	3	4	5	YES	NO
47. Did a friend become ill?	YES	NO	1	2	3	4	5	YES	NO
48. Did a relative or friend move into your home?	YES	NO	1	2	3	4	5	YES	NO
49. Did a relative or friend move out of your	YES	NO	1	2	3	4	5	YES	NO

home?									
50. Did you move?	YES	NO	1	2	3	4	5	YES	NO
51. Did rats, mice or insects bother you in your home?	YES	NO	1	2	3	4	5	YES	NO
52. Did you have trouble with your landlord?	YES	NO	1	2	3	4	5	YES	NO
53. Did you have trouble with your neighbors?	YES	NO	1	2	3	4	5	YES	NO
54. Did you have trouble with social service agencies?	YES	NO	1	2	3	4	5	YES	NO
55. Did you have trouble with medical or health professionals?	YES	NO	1	2	3	4	5	YES	NO
56. Did someone treat you unfairly because of your age?	YES	NO	1	2	3	4	5	YES	NO
57. Did someone treat you unfairly because of your sex?	YES	NO	1	2	3	4	5	YES	NO
58. Did someone treat you unfairly because of your race?	YES	NO	1	2	3	4	5	YES	NO
59. Did someone treat you unfairly because you didn't have a lot of money?	YES	NO	1	2	3	4	5	YES	NO
60. Did you work in the last six months? <b>IF NO, SKIP TO 64.</b>	YES	NO	1	2	3	4	5	YES	NO
61. Did you begin a new job or get promoted?	YES	NO	1	2	3	4	5	YES	NO
62. Did you get laid off?	YES	NO	1	2	3	4	5	YES	NO
63. Did you have trouble with superiors at work?	YES	NO	1	2	3	4	5	YES	NO
64. Did you look for a job?	YES	NO	1	2	3	4	5	YES	NO
64. Did a family pet die?	YES	NO	1	2	3	4	5	YES	NO
64. Did a close family member divorce or separate?	YES	NO	1	2	3	4	5	YES	NO



## The Peritraumatic Distress Inventory

**Instructions:** Which earthquake has been the worst for you?

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Please complete the following items by circling the number that best describes the experiences you have had during that earthquake and immediately after.

If an item does not apply to your experience, please circle “not at all true”.

	NOT AT ALL TRUE	SLIGHTLY TRUE	SOMEWHAT TRUE	VERY TRUE	EXTREMELY TRUE
1. I felt helpless.	0	1	2	3	4
2. I felt sadness and grief.	0	1	2	3	4
3. I felt frustrated or angry.	0	1	2	3	4
4. I felt afraid for my own safety.	0	1	2	3	4
5. I felt guilt.	0	1	2	3	4
6. I felt ashamed of my emotional reactions.	0	1	2	3	4
7. I felt worried about the safety of others.	0	1	2	3	4
8. I had the feeling I was about to lose control of my emotions.	0	1	2	3	4
9. I had difficulty controlling my bowel and bladder.	0	1	2	3	4
10. I was horrified by what I saw.	0	1	2	3	4
11. I had physical reactions like sweating, shaking, and my heart pounding.	0	1	2	3	4
12. I felt I might pass out.	0	1	2	3	4
13. I thought I might die.	0	1	2	3	4

## Connor-Davidson Resilience Scale (CD-RISC)

For each item, please circle the response that best indicates how much you agree with the following statements as they apply to you over the past **week**. If a particular situation has not occurred recently, answer according to how you think you would have felt.

	NOT TRUE AT ALL	RARELY TRUE	SOMETI MES TRUE	OFTEN TRUE	TRUE NEARLY ALL THE TIME
<b>How true are the following statements over the past week</b>					
1. I am able to adapt when changes occur.	0	1	2	3	4
2. I have at least one close and secure relationship that helps me when I am stressed	0	1	2	3	4
3. When there are no clear solutions to my problems, sometimes fate or God can help.	0	1	2	3	4
4. I can deal with whatever comes my way.	0	1	2	3	4
5. Past successes give me confidence in dealing with new challenges and difficulties	0	1	2	3	4
6. I try to see the humorous side of things when I am faced with problems.	0	1	2	3	4
7. Having to cope with stress can make me stronger.	0	1	2	3	4
8. I tend to bounce back after illness, injury, or other hardships.	0	1	2	3	4
9. Good or bad, I believe that most things happen for a reason.	0	1	2	3	4
10. I give my best effort no matter what the outcome may be.	0	1	2	3	4
11. I believe I can achieve my goals, even if there are obstacles.	0	1	2	3	4
12. Even when things look hopeless, I don't give up.	0	1	2	3	4
13. During times of stress/crisis, I know where to turn for help.	0	1	2	3	4
14. Under pressure, I stay focused and think clearly.	0	1	2	3	4
15. I prefer to take the lead in solving problems rather than letting others make all the decisions.	0	1	2	3	4
16. I am not easily discouraged by failure.	0	1	2	3	4
17. I think of myself as a strong person when dealing with life's challenges and difficulties.	0	1	2	3	4
18. I can make unpopular or difficult decisions that affect other people, if it is necessary.	0	1	2	3	4
19. I am able to handle unpleasant or painful feelings like sadness, fear, and anger.	0	1	2	3	4
20. In dealing with life's problems, sometimes you have to act on a hunch without knowing why.	0	1	2	3	4
21. I have a strong sense of purpose in life.	0	1	2	3	4
22. I feel in control of my life.	0	1	2	3	4
23. I like challenges.	0	1	2	3	4
24. I work to attain my goals no matter what roadblocks I encounter along the way.	0	1	2	3	4
25. I take pride in my achievements.	0	1	2	3	4

## Posttraumatic Growth Inventory

**Instructions:** Indicate for each of the statements below the degree to which this change occurred in your life as a result of the earthquakes, using the following scale.

0= I did not experience this change as a result of the earthquakes.

1= I experienced this change to a very small degree as a result of the earthquakes.

2= I experienced this change to a small degree as a result of the earthquakes.

3= I experienced this change to a moderate degree as a result of the earthquakes.

4= I experienced this change to a great degree as a result of the earthquakes.

5= I experienced this change to a very great degree as a result of the earthquakes.

	NOT AT ALL	TO A VERY SMALL DEGREE	TO A SMALL DEGREE	TO A MODERA TE DEGREE	TO A GREAT DEGREE	TO A VERY GREAT DEGREE
1. I changed my priorities about what is important in life.	0	1	2	3	4	5
2. I have a greater appreciation for the value of my own life.	0	1	2	3	4	5
3. I developed new interests.	0	1	2	3	4	5
4. I have a greater feeling of self-reliance.	0	1	2	3	4	5
5. I have a better understanding of spiritual matters.	0	1	2	3	4	5
6. I more clearly see that I can count on people in times of trouble.	0	1	2	3	4	5
7. I established a new path for my life.	0	1	2	3	4	5
8. I have a greater sense of closeness with others.	0	1	2	3	4	5
9. I am more willing to express my emotions.	0	1	2	3	4	5
10. I know better that I can handle difficulties.	0	1	2	3	4	5
11. I am able to do better things with my life.	0	1	2	3	4	5
12. I am better able to accept the way things work out.	0	1	2	3	4	5
13. I can better appreciate each day.	0	1	2	3	4	5
14. New opportunities are available which wouldn't have been otherwise.	0	1	2	3	4	5
15. I have more compassion for others.	0	1	2	3	4	5
16. I put more effort into my relationships.	0	1	2	3	4	5
17. I am more likely to try to change things which need changing.	0	1	2	3	4	5
18. I have a stronger religious faith.	0	1	2	3	4	5
19. I discovered that I'm stronger than I thought I was.	0	1	2	3	4	5
20. I learned a great deal about how wonderful people are.	0	1	2	3	4	5
21. I better accept needing others.	0	1	2	3	4	5

## Appendix F: Interview prompts for Study 2



**Canterbury**  
District Health Board  
Te Pōari Hauora o Waitaha

The Christchurch School of Medicine  
DEPARTMENT OF PSYCHOLOGICAL MEDICINE

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### Understanding earthquake-related stresses

#### Interview guidelines

A semi-structured interview is to be conducted based on the following open questions.

Other questions may be asked to clarify responses to these questions. Prompts may be used if participants do not mention any symptoms or particular stressors.

1. Tell me about your experience in the Canterbury earthquakes.
  - Which earthquake(s) were the most impactful for you?
    - Were you in Christchurch / Canterbury for all of the large quakes?
  - 4 September 2010 Yes / No
  - 26 December (Boxing Day) 2010 Yes / No
  - 22 February 2011 Yes / No
  - 13 June 2011 Yes / No
  - What kind of immediate impact did the earthquakes have on you? Since then? Most impactful aspects? (prompt re exposure, e.g. where were you? what did you experience? what did you see/hear? What happened to you, family, close friends, injury to self/others, death of friend/family/associate?)
  - What changes have occurred since the earthquakes (prompt re impacts on work, finances, home, land, school, transport, any other issues?)
  - What things have bothered you the most? Fears? Concerns? Have you noticed that you are more angry,
2. Before September 2010, did you have problems such as severe stress, anxiety, depression, alcohol or drug problems or any other psychological difficulties?
3. What kinds of things have you been doing to cope with the earthquakes and their effects?
  - What are the things that have helped you cope?
  - or have been using more alcohol or other drugs or doing others things to help you cope?
4. What positive effects have there been from the earthquakes?
  - personal strength?
  - different way of looking at things? New meaning?
  - greater connectedness to other people/neighbours? Greater sense of community?
  - spiritual beliefs?
  - appreciation of life?
5. Is there anything else you would like to add that we might have missed out?